PREPARED FROM PREVIOUS QUESTIONS OF ANNUAL BOARD PAPERS

2014-2015-2016-2017-2018-2019

OF ALL SECONDARY BOARDS

IN ACCORDANCE WITH THE

ACCELERATED LEARNING PROGRAMME

(ALP)

(SMART SYLLABUS)

ISSUED BY PCTB.

• HAMDARD •

UP-TO-DATE SMART PAPERS

SHORT-CUT FORMULA OF BEST PREPARATION IN LIMITED TIME

BIOLOGY

- CHAPTER WISE QUESTIONS
- ANNUAL PAPERS

(FROM PREVIOUS ALL PUNJAB & AJK BOARD PAPERS)

PREPARED FROM PREVIOUS QUESTIONS OF ANNUAL BOARD PAPERS

2014-2015-2016-2017-2018-2019

OF ALL SECONDARY BOARDS

IN ACCORDANCE WITH THE
ACCELERATED LEARNING PROGRAMME
(ALP)
(SMART SYLLABUS)
ISSUED BY PCTB.

Scholar

• HAMDARD •

UP-TO-DATE SMART PAPERS

SHORT-CUT FORMULA OF BEST PREPARATION IN LIMITED TIME

SOLVED

MOST FAVOURITE UP-TO-DATE PAPERS DUE TO 100% SUCCESSFUL GUESS

BIOLOGY

- CHAPTERWISE QUESTIONS
- ANNUAL PAPERS

11

INTER PART I

WARNING

"علم حاصل کرنا ہر مسلمان مرد و عورت پر فرض ہے"

علم روشنی ہے اور یہ روشنی پھیلانے میں ہمدرد کتب خانہ گزشتہ نصف صدی سے زیادہ عرصہ سے کوشاں ہے۔ طلبا و طالبات کے لیے بہترین اور معیاری کتب کی فراہمی ادارے کی اولین ترجیح ہے۔ ہمارا عزم ہے کہ ملک کا ہر فرد زیورِ تعلیم سے آراستہ ہو کر ملک و قوم کی ترقی میں اپنا کردار ادا کرے۔ ان شاء اللہ ہم اس مذہبی، اخلاقی اور انسانی فریضہ کو احسن طریقہ سے سرانجام دے کر ملک و ملت کی ترقی میں اپنا کردار ادا کرتے رہیں گے۔

چیئرمین

Managing Director: Kashif Hussain Gohar

Project Director: Muhammad Asif Saeed

Project Managers: Ghulam Mustafa

Writers: Senior Teachers & Educationalists

Layout, Composing & Designing: Hamdard Composing & Designing Section

Sales Managers: Fawad Iqbal, Hasnain Shah

Printing Managers: Tariq Rasheed

Marketing Managers: Raja Yasir, Muhammad Khalid

Printing Press: Pak Afghan Printing Press, Lahore.

Head Office: Hamdard Educational Center, Urdu Bazaar, Lahore. Tel: 042-37211337

Hamdard Kutab Khana
Technical & Educational Publishers

Smart Syllabus Biology (Intermediate Part I)

CHAPTER 1: INTRODUCTION

Biology and some major fields of specialization, Biological method, Biology and the service of mankind (excluding the subtopics "Disease Control","Preventive measures", "Vaccination and Immunization", and "Drug Treatment/ Gene therapy") (Pg. 1-13)

Practicals: No practical

Questions:

Classwork: Fill in the blanks (i-iii, ix), True and false (No), Multiple choice questions (i,iv)

Homework: Short questions (i-iv), Extensive questions (i, iv, v)

CHAPTER 2: BIOLOGICAL MOLECULES

Introduction to biochemistry, Importance of water, Carbohydrates (excluding the subtopics "monosaccharides", "oligosaccharides", "polysaccharides"), Lipids (excluding the subtopics "acylglycerols", "waxes", "phospholipids", "terpenoids"), Proteins, Structure of proteins, Nucleic acids (excluding the subtopics "DNA" and "RNA") (Pg. 17-31)

Practicals:

1. Identification of biochemical from biological materials
2. Iodine test for starch
3. Benedict's test for reducing sugars
4. Millon's test for Proteins/Biuret test for proteins
5. Sudan III test for fats and oils and emulsion test

Questions:

Classwork: Fill in the blanks (i, ii), True and false (i), Multiple choice questions (iv)

Homework: Short questions (ii, iv and v), Extensive questions (i, iii)

CHAPTER 3: ENZYMES

Introduction, Characteristics of enzymes, Mechanism of enzyme action (catalysis), Inhibitors, Irreversible inhibitors, Reversible inhibitors (competitive & non-competitive inhibitors) (Pg. 37-43)

Practicals: Study of starch break down in germinating gram seeds.

Questions:

Classwork: Fill in the blanks (i-v), True and false (i-v), Multiple choice questions (No)

Homework: Short questions (i, iii-v), Extensive questions:(1, 3, 4)

CHAPTER 4: THE CELL

Structure of a generalized cell, Plasma membrane, Cell wall, Cytoplasm, Endoplasmic reticulum, Ribosomes, Golgi apparatus, Lysosomes, Vacuoles, Cytoskeleton, Centrioles, Mitochondria, Plastids (Chloroplasts, Chromoplasts, Leucoplasts), Nucleus (complete topic) Prokaryotic and eukaryotic cell (Pg. 48-64)

Practicals: Study of animal cells (frog's epithelium cell, frog's buccal cavity cells) and plant cells (mesophyll cells, leaf epidermis cells, onion epidermis cells) by staining with safranin, acid fuchsin, methylene blue, eosine

Questions:

Classwork: Fill in the blanks (i-v), True and false (i-v), Multiple choice questions (i-v)

Homework: Short questions (i-xi), Extensive questions (i, v)

CHAPTER 5: VARIETY OF LIFE

Introduction, Nomenclature, Two to five kingdom classification systems, Viruses (excluding the introductory paragraphs), Characteristics, Structure, Life cycle of bacteriophages, Some viral diseases: small pox, herpes, influenza, mumps and measles, polio, AIDS, Hepatitis (Pg. 67-80)

Practicals: No practical

Questions:

Classwork: Fill in the blanks (i-x), Multiple choice questions (i-xiv)

Homework: No Short question, No extensive question

CHAPTER 6: KINGDOM PROKARYOTAE (MONERA)

Structure of bacteria, Size, Shape of bacteria, Bacterial cell structure (complete topic - page 86 to 89), Nutrition of bacteria, Respiration in bacteria, Growth and Reproduction, Control of bacteria (Physical methods, Chemical methods), Use and misuse of antibiotics, Characteristics of Cyanobacteria (Pg.84-94)

Practicals:

1. Laboratory safety techniques and use of microscope and measurement of microscopic objects by micrometry.
2. Investigation of bacterial content of fresh and stale milk.
3. Study of Nostoc from fresh material and prepared slides.

Questions:

Classwork: Fill in the blanks (i-vi, vii), Multiple choice questions (i-vi)

Homework: Short questions (i a, b, ii-ix), Extensive questions (i-iii, v)

CHAPTER 7: THE KINGDOM PROTISTA (OR PROTOCTISTA)

Introduction, Major groups of Protista, Protozoa: Animal-like protists, Amoebae, Zooflagellates, Ciliates, Algae: Plant-like protists, Euglenoids, Brown algae, Red algae, Green algae, Importance of algae, Fungus-like protists, Slime molds, Water molds (Pg. 99-111)

Practicals: Identification of Chlorella, Paramecium, Amoeba, Entamoeba, Plasmodium (malarial parasite) Euglena, Volvox, Ulothrix and Ulva from fresh materials or prepared slides.

Questions:

Classwork: Fill in the blanks (i, ii, v-viii)

Homework: Short questions (i, iv, v), Extensive questions (i-ix)

CHAPTER 8: FUNGI (The Kingdom of Recyclers)

Introduction, The body of fungus, Nutrition in fungi, Reproduction, Asexual reproduction, Sexual reproduction, Classification of fungi, Zygomycota, Ascomycota, Basidiomycota, Deuteromycota, Importance of fungi, Ecological importance, Commercial importance, Economic gains due to fungi, Economic losses due to fungi (Pg.113-128)

Practicals: Study of yeast, Ustilago tritici and Pencillium from fresh materials and slides

Questions:

Classwork: Multiple choice questions (i-viii)

Homework: Short Questions (i-x), Extensive questions (i-viii)

CHAPTER 9: KINGDOM PLANTAE

Classification of Plantae, Division Bryophyta, Adaptation to land habitat, Division Tracheophyta, Evolution of leaf, Evolution of seed habit, Class Gymnospermae (excluding the subtopic "Pinus - life cycle"), Class Angiospermae, Life cycle of an angiospermic plant, Seed formation, double fertilization, Classification of angiosperms (excluding the topic and subtopics of "Angiospermic families") (Pg. 131-153)

Practicals:

1. Examination of Marchantia and Funaria (external morphology) from fresh material and of sex organs from prepared slides.
2. Study of Pinus: male and female cones from fresh or preserved materials.

Questions:

Classwork: Fill in the blanks (i-ix), Multiple Choice Questions (i-iv)

Homework: Short Questions (ii b, iv, vii), Extensive questions (ii-vi)

CHAPTER 10: KINGDOM ANIMALIA

Introduction, Grade Radiata, Grade Bilateria, Diploblastic and triploblastic organization, Acoelomates, pseudocoelomates, coelomates , Series proterostomia & Series ducterostomia, Phylum Porifera, Phylum Coelenterata (excluding the subtopic "Polymorphism"), Phylum Platyhelminthes (excluding the subtopics "infestation" and "disinfestation"), Adaptation for parasitic mode of life, Aschelminthes (Phylum Nematoda), Phylum Annelida (excluding the subtopics of classes "Polychaeta", "Olignchaeta", and "Hirudinea"), Phylum Arthropoda (excluding the subtopics of classes "Crustacea", "Insecta", "Arachnida", and "Myriapoda"), Metamorphosis, Economic importance of arthropods, Phylum Mollusca (excluding the subtopics of classes "Gastropoda", "Bivalvia" and "Cephalopoda"), Economic importance of Mollusca, Phylum Echinodermata, Echinodermata / Affinities, Phylum Chordata, Sub-phylum Vertebrata , Class Chondrichthyes, Class Osteichthyes (excluding the subtopic "adaptations for aquatic life, Class Amphibia, Class Reptilia, Class Aves, Characters of Birds, Class Mammalia, Sub-class Prototheria, Sub-class Metatheria, Sub-class Eutheria (Pg. 167-203)

Practicals: Exposure of respiratory system of frog.

Questions:

Classwork: Fill in the blanks (i-x), Multiple choice questions (i, ii, iv, v, vi, vii)

Homework: Extensive questions (i, ii, vii, viii)

CHAPTER 11: BIOENERGETICS

Introduction, Photosynthesis, Photosynthetic reactants and products, Water and photosynthesis, Photosynthetic pigments (Chlorophyll, Carotenoids), Reactions of photosynthesis, Light dependent reactions, Non-cyclic phosphorylation, Cyclic phosphorylation, Chemiosmosis, Light independent (or dark) reactions, Respiration, Anaerobic and aerobic respiration, Anaerobic Respiration (alcoholic fermentation, lactic acid fermentation), Cellular Respiration, Glycolysis, Pyruvic acid oxidation, Krebs cycle, Respiratory chain (Pg. 206-228)

Practicals: Extraction and chromatography of leaf chloroplast pigments.

Questions:

Classwork: Fill in the blanks (i-v), Multiple choice questions (i-iii)

Homework: Extensive questions (i-iii, vii-x, xii, xiii)

CHAPTER 12: NUTRITION

Methods of plant nutrition (saprophytic nutrition, parasitic nutrition, symbiotic nutrition, nutrition in insectivorous plants), Digestion and absorption, Digestion in Man, Digestion in oral cavity, Digestion in stomach, Digestion in small intestine, Absorption of food, Large intestine, Some common diseases related to nutrition (Dyspepsia, Food poisoning, Obesity, Ulcer) (Pg. 235- 256)

Practicals: Study of T.S of liver, stomach, small intestine and large intestine of man prepared slides.

Questions:

Classwork: Fill in the blanks (i-viii), True and false (i-iii), Multiple choice questions (i-iii, vi-vii, ix)

Homework: Short questions (i, iii, iv), Extensive questions (i-iv, ix-xii, xiv-xv)

CHAPTER 13: GASEOUS EXCHANGE

Advantages and disadvantages of gas exchange in air and water, Gaseous exchange in plants, Properties of respiratory surfaces, Respiration in man, Air passage ways, Inspiration, Expiration, Transport of respiratory gases, Transport of oxygen, Transport of carbon dioxide, Carbon dioxide concentration in arterial and venous blood, Respiratory disorders (Cancer, Tuberculosis, Asthma), Role of respiratory pigments, Lung capacities (Pg. 259-275)

Practical: No practical

Questions:

Classwork: Fill in the blanks (ii-v), True and false (i-ii, v), Multiple choice questions (i, iii-v)

Homework: Short questions (i-v), Extensive questions (i, v-vii)

CHAPTER 14: TRANSPORT

Transport in plants - Uptake and transport of minerals and water, Mineral absorption by roots, Processes involved in absorption by roots, Uptake of water by roots, Apoplast pathway, Symplast pathway, Vacuolar pathway, Ascent of sap, Cohesion tension theory, Mechanism of transpiration pull in cohesion and tension theory, Root pressure, Imbibition, Bleeding, Opening and closing of stomata, Mechanism of phloem translocation/transport, Diffusion, Pressure flow theory, Circulatory system, Characteristics of circulatory system, Open and closed circulatory system, Comparison of open and closed circulatory system, Transport in man, The circulatory fluid - the blood, Functions of blood, Disorders (blood cancer, thalassaemia), Pumping organ - The heart. Structure and action, The cardiac cycle, Mechanism of heart Excitation and Contraction Electrocardiogram, Artificial pace-maker, Blue babies, Blood vessels, Arteries, Capillaries, Veins, Blood pressure and rate blood flow, Hypertension, Thrombus formation and hypertension, Heart attack, Stroke, Hemorrhage, Lymphatic system, Immunity, Types of immunity (Pg. 278-327)

Practicals:

1. Demonstration of osmosis in living plant cells. (manifested by plasmolysis and deplasmolysis) of onion cells or spirogyra.
2. Study from prepared slides of internal structure of monocot. and dicot. root, stem and leaf.

3. Investigation of stomatal distribution (using clear nail varnish or epidermis peel)
4. Study of prepared, stained slide of human blood including identification of phagocytes and lymphocytes and preparation of slide of blood smear of frog.
5. Study of structure of artery, vein, capillary from their T.S. (Prepared Slides)
6. Study of effect of acetylcholine and adrenaline on the heartbeat of frog.
7. Exposure of blood circulatory system of frog (heart and main blood vessels).
8. Measurement of blood pressure during rest and after exercise with B.P apparatus.

Questions:

Classwork: Fill in the blanks (i-vi), Multiple choice questions (i-ix), True and false (i-v)

Homework: Extensive questions (i-v, vii, ix)

CONTENTS

Chapter Wise Questions 2014 - 2019

Annual Papers 2014-2019

CHAPTER 01

Introduction

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. **The study of distribution of animals in nature is called:** (GRW, GI, 2014) (GRW, GII, 2015)
   (A) Zoogeography (B) Biodiversity (C) Geography (D) Wild life
2. **The study of internal structure is:** (AJK, GI, 2015) (MLN, GI, 2016)
   (A) Morphology **(B) Anatomy** (C) Histology (D) Physiology
3. **The number of species identified so far is:** (AJK, GII, 2014)
   (A) 10 million (B) 5 million **(C) 2.5 million** (D) 1.5 million
4. **The branch of Biology which deals with the study of ancestral history of living organisms is called as:** (FBD, GI, BWP, GI, 2014) (DGK, 2019)
   (A) Paleontology (B) Zoogeography **(C) Evolution** (D) Heredity
5. **Embryology is the study of:** (GRW, GI, 2014)
   (A) Fossils (B) Tissues
   (C) Development (D) Internal gross structure
6. **In human body, amount of phosphorous is:** (BWP, GII, 2016)
   (A) 1% (B) 2% (C) 18% (D) 22%
7. **Mammals became dominant in:** (MLN, GI, 2016) (LHR, GII, 2019)
   (A) Mesozoic period **(B) Cenozoic period**
   (C) Paleozoic period (D) Jurasic period
8. **The study of microorganism includes bacteria, virus, protozoan and microscopic algae and fungi is:** (AJK, GI, 2015)
   (A) Microbiology (B) Parasitology (C) Molecular biology (D) Biotechnology
9. **The study of parasite is called:** (LHR, GI, 2016)
   (A) Paleontology (B) Histology (C) Microbiology **(D) Parasitology**
10. **The number and verity of species in a place is called:** (BWP, GI, 2016) (FBD, GI, 2019)
    (A) Population **(B) Community** (C) Biodiversity (D) Diversity
11. **The muscles of stomach is of which type?** (SGD, GI, 2015)
    (A) Skeletal (B) Smooth (C) Cardiac (D) All above
12. **Fungi, algae, protozoans and various prokaryotes are:** (LHR, GI, 2016)
    (A) 17.6% (B) 19.9% **(C) 9.4%** (D) 9.1%
13. **The number of the species of insects is:** (LHR, GII, 2017) (SGD, 2018)
    (A) 53.1 % (B) 17.6 % (C) 19.9 % (D) 9.4 %
14. **The reasoning from the general to specific is:** (LHR, GII, DGK, GII, 2015) (MLN, GI, 2019)
    (A) Deductive (B) Inductive (C) Scientific (D) Theoretical
15. **The most recent era is:** (LHR, GII, 2016) (SWL, 2018) (RWP, 2019)
    (A) Proterozoic (B) Paleozoic **(C) Cenozoic** (D) Mesozoic
16. **The branch of Biology which deals with the study of social behavior and communal life of human being is:** (RWP, GI, 2016) (GRW, 2018)
    (A) Human biology (B) Molecular biology
    (C) Social biology (D) Environmental biolgy

17. **The amount of Na by weight in the human body is:** (GRW. GII. 2014)
(A) 0.35% (B) 0.25% **(C) 0.15%** (D) 0.05%

18. **The percentage of potassium in the human body is:** (RWP. GI. 2016)
(A) 0.15% (B) 0.05% **(C) 0.35%** (D) 0.25%

19. **One of the following is a micromolecule:** (SGD. GI. 2016)
(A) Starch (B) Protein (C) Cellulose **(D) Glucose**

20. **The unit of life is called:** (RWP. GI. 2016)
(A) Organ **(B) Cell** (C) Tissue (D) Organelle

21. **The microscopic study of tissues is called:** (RWP. GI. 2015)
(A) Histology (B) Microbiology (C) Bacteriology (D) Virology

22. **In human body amount of oxygen is:** (LHR. GII. 2017)
(A) 50% **(B) 65%** (C) 70% (D) 40%

23. **Study of functions of different parts of an organism:** (SGD. GI. 2017) (ATK. 2018)
(A) Morphology **(B) Physiology** (C) Anatomy (D) Ecology

24. **In human body amount of carbon (C) is:** (GRW. GI. DGK. GII. 2017)
(A) 65% (B) 10% **(C) 18%** (D) 3%

25. **Living substance of living things is called:** (FBD. GI. 2016)
(A) Cytoplasm (B) Cell (C) DNA **(D) Protoplasm**

26. **The percentage of hydrogen present in human body is:** (RWP. GI. 2017)
(A) 20% (B) 15% **(C) 10%** (D) 5%

27. **The branch of Biology which deals with the structure of organisms, the cells their organelles at molecular level is:** (MLN. GI. 2014)
(A) Molecular Biology (B) Marine Biology
(C) Physiology (D) Histology

28. **Cretaceous, Jurrasic and Triassic are Periods of Era:** (BWP. GI. 2016)
(A) Proterozoic (B) Palaeozoic **(C) Mesozoic** (D) Cenozoic

29. **Histology is the study of:** (DGK. GI. 2014)
(A) Cell (B) Functions **(C) Tissues** (D) Fossils

30. **The percentage of calcium in human body is:** (FBD. 2018)
(A) 1% **(B) 2%** (C) 3% (D) 4%

31. **Which one is a trace element?** (RWP. 2018)
(A) Calcium (B) Chlorine **(C) Zinc** (D) Phosphorus

32. **The branch of Biology which deals with the study of environmental relations of organisms is called :** (DGK. GII. 2018)
(A) Morphology **(B) Ecology** (C) Evolution (D) Zoogeography

33. **Which one of these is Macro Molecule?** (RWP. 2018)
(A) H_2O (B) CO_2 (C) O_2 **(D) Starch**

34. **Internal morphology is also called:** (SGD. 2018)
(A) Physiology **(B) Anatomy** (C) Histology (D) Palaeontology

SHORT ANSWER QUESTIONS

1. **Define physiology.** (LHR. GI. 2017)

Ans. **Physiology:** The branch of Biology which deals with the study of functions of different parts of organisms is called physiology.

2. **Define biochemistry.** (LHR. GI. 2017)

Ans. **Biochemistry:** The branch of Biology which deals with the study of chemical components and the chemical processes in living organism is called biochemistry.

3. **Give four characteristics of living organisms.** (LHR. GII, 2016) (AJK. 2018)

Ans. Characteristics of living organisms:

i. The are highly organized.
ii. They have complex structure.
iii. They are made up of one or more cells.
iv. They have genetic program of their characteristics.

4. **What are bio-elements? Give their proportion in human body.** (BWP. GI, 2014) (GRW. 2018)

Ans. Bio - Elements: Elements which occur in living organisms are called bioelements.

Proportions of bioelements in humans are:

Oxygen (65%), carbon (18%), hydrogen (10%), nitrogen (3%), calcium (2%) and phosphours (1%).

5. **Define microbiology and biotechnology.** (AJK. GI, 2015) (MLN. GI, 2017) (MLN. GI, 2018) (LHR. GII, 2019)

Ans. Microbiology: Microbiology is the branch of Biology which deals with the study of microorganisms including bacteria, viruses, protozoa and microscopic algae and fungi.

Biotechnology: Biotechnology is the branch of Biology which deals with the study of the use of living organisms, systems or processes in manufacturing and service industries.

6. **Define zoogeography and parasitology.** (AJK. GII, 2014)

Ans. Zoogeography: The study of distribution of animals in nature or various regions is called zoogeography.

Parasitology: It deals with the study of parasites. The structure mode of transmission, life histories and host parasite relationships are studied in parasitology.

7. **Write the names of four eras of geological time chart.** (SWL. GI, 2014) (LHR. GII, 2016) (MLN. GII, DGK. GI, 2017) (SWL. 2019)

Ans. The names of four eras of geological time chart are:

i. Proterozoic ii. Palaeozoic iii. Mesozoic iv. Cenozoic

8. **Differentiate between Fresh water Biology and Marine Biology.** (MLN. GI, BWP. GI, 2016) (MLN. GI, 2017)

Ans.

Fresh Water Biology	Marine Biology
This branch of biology deals with the organisms living in fresh water bodies i.e., rivers, lakes etc and physical and chemical parameters of these water bodies.	This is the study of life in seas and oceans. This includes the study of the marine life and the physical and chemical characteristics of the sea acting as factors for marine life.

9. **Define Ecology and Histology.** (SWL. GI, 2016)

Ans. Ecology: Ecology is the study of relationship of organisms to their environment, e.g., effect of temperature on organisms.

Histology: Histology is the microscopic study of living tissues, e.g., study of liver under microscope.

10. **Define biodiversity. Give the percentage of different groups of organisms.** (LHR. GII, BWP. GI, 2014) (RWP. GI, 2017) (RWP. 2019)

Ans. Biodiversity: Biodiversity refers to the number and variety of species in a place.

Percentage of Different Groups of Organisms:

More than half of organisms are insect (53.1 %), vascular plants (17.6 %), animals other than species are 19.9% (281, 000 species) and 9.4 % are fungi, algae, protozoa, and various other prokaryotes.

11. **Define Parasitology.** (LHR. GI, 2016)

Ans. Parasitology: Parasitology is the branch of Biology which deals with the study of Parasites. The structure, mode of transmission, life histories and host-parasite relationship are studied in parasitology.

12. **What are Micromolecules and Macromolecules?** (FBD. GI, 2015) (GRW. GII, SWL. GI, DGK. GI, 2016) (RWP. GII, 2017) (LHR. GII, DGK. GI, 2018)

Ans. Micromolecules: Micromolecules are molecules with low molecular weights, e.g., CO_2, H_2O etc.

Macromolecules: Macromolecules are molecules with high molecular weights, e.g. starch, protein etc.

13. **Name at least four ways to which lead to form a hypothesis.** (DGK. GII, 2015)

Ans. Four ways leading to Hypothesis:

i. Deductive reasoning
ii. Inductive reasoning
iii. Esthetic perference
iv. Intuition or imagination

14. **What is significance of study of fossils?** (RWP. GI, 2014)

Ans. Significance of study of fossils: By studying the fossils we can get information about ancestral history of organisms and also get information about the environmental conditions of past.

15. **What are six bioelements by which 99% part of the human body is formed?**

Ans. Oxygen 65%, Carbon 18%, Hydrogen 10%, Nitrogen 3%, Calcium 2% and phosphorous 1% are six bioelements by which 99% part of the human body is formed.

16. **How and when a hypotheses becomes a theory?** (FBD. GII, 2016)

Ans. A series of hypotheses supported by the results of many tests which is then known as theory. When a hypothesis is supported by the results of many experiments is it become a theory.

17. **How we can determine the age of rocks?** (SWL. GI, 2015)

Ans. The age of the rock is determined by comparing the amount of certain radio isotopes they contain. The older sediment layers have less amount of these specific radio isotopes than the younger layers. A comparison of the layers gives an indication of the relative age of the fossils found in the rocks.

18. **Define bioelements. Give two examples.** (LHR. GII, 2017)

Ans. Bio. Elements: The 16 elements and a few others which occur in a particular organism are called bioelements.

Examples: Oxygen, Carbon.

19. **What is deductive reasoning? Give one example.** (RWP. GI, 2017) (LHR. GII, 2018)

Ans. In deductive reasoning a specific conclusion is drawn from a general rule or principle.

Example: If we accept that all the birds have wings and that sparrow is a bird, then we must conclude that sparrow must have wings.

20. **Define phyletic lineage and biodiversity.** (LHR.GI, RWP. GI 2015) (LHR. GII, DGK. GII, 2016) (LHR. GI, 2017) (DGK. GII, 2018) (MLN. GI, 2019)

Ans. Phyletic Lineage: "A phyletic lineage is an unbroken series of species arranged in ancestor to descendant sequence with each later species having evolved from one that immediately preceded it."

Biodiversity: "Biodiversity is the number and variety of species in a place." It is the variety within and between all species of plants, animals and micro-organisms and the ecosystems within which they live and interact.

21. **Define deductive reasoning and inductive reasoning.** (LHR. GII, FBD. GI, 2014) (LHR. GI, GRW. GI, 2016) (LHR. GII, LHR. GI, 2017)

Ans. Deductive Reasoning: "Deductive reasoning is a reasoning from the general to the specific."

Example: If we accept that all birds have wings and that sparrows are birds, then we conclude that sparrows have wings.

Inductive Reasoning: "Inductive reasoning is a reasoning from the specific to the general".

Example: If we know that sparrows have wings and are birds, and we know that eagle, parrot, crow are, birds, then we induce that all birds have wings.

22. How does theory differ from law? (GRW. GI, 2014) (GRW. GII, RWP. GI, AJK. GI, 2015) (GRW. GI, 2016) (MLN. GI, 2017)

Ans.

Theory	Law
When a series of hypothesis is supported by the results of many tests then it is called a theory.	When a theory survives after testing further by many scientists and continues to be supported then it becomes a scientific law.

23. Define scientific Law. Give two examples. (SWL. GI, 2014) (MLN. GI, 2016)

Ans. Scientific Law: A scientific law is a uniform fact of nature; it is virtually an irrefutable theory, e.g., Hardy Weinberg Law and Mendel Law of Inheritance.

24. What is hydroponic culture technique? Give its importance. (GRW. GI, SGD. GI, 2014) (FBD. GI, 2016) (MLN. GI, RWP. GI, GRW. GI, 2017) (GRW, FBD. GI, DGK. 2019)

Ans. Hydroponic Culture Technique: Hydroponic culture technique is used to test whether a certain nutrient is essential for plant or not. In this technique the plants are grown in aerated water to which nutrient mineral salts have been added.

Importance: Astronauts may use it for growing vegetables.

25. What is "integrated disease management"? (GRW. GI, SGD. GI, DGK. GI, 2015) (SWL. GI, RWP. GI, 2017) (FBD, RWP, 2018) (SWL. 2019)

Ans. Integrated Disease Management: Integrated disease management is effective control of a particular disastrous disease can be achieved by using all relevant, appropriate methods, of diseases control. This also requires awareness of the community about the severity of the problem, its causes and its remedies e.g., Dengue fever.

26. Differentiate between anatomy and morphology. (LHR. GI, 2018)

Ans.

Anatomy	Morphology
The study of internal structures or organs e.g., stomach, pancreas, kidney, is called anatomy.	The study of form and structure of living things is called morphology.

27. Define ecosystem with an example. (LHR. GI, 2018)

Ans. Ecosystem: A community together with its nonliving surroundings is called ecosystem.

Example: Snake, antelope, hawk, bushes, grass, rocks, stream.

28. Define molecular biology. (GRW. 2018)

Ans. Molecular Biology: It is the study of the structure of organisms, their cells and their organelles at molecular level.

29. What is embryology? (FBD. 2018)

Ans. Embryology: The study of the development of an embryo from a fertilized egg or zygote until it is born or hatched is called embryology.

30. Differentiate between Hypothesis and Theory. (MLN. GI, 2018)

Ans.

Hypothesis	Theory
A statement on the basis of experience and background knowledge of the event after organizing observations into data form is called hypothesis.	A series of hypothesis supported by the results of many tests is called a theory.

31. **What are bio-pesticides? Give one example.** (MLN, GI, 2018)

Ans. **Bio-Pesticides:** Bio pesticides are certain type of pesticides derived form such natural materials as animals, plants, bacteria and certain minerals.

Example: Canola oil and backing soda have pesticides applications and are considered bio pesticides.

32. **What is the difference between deductive reasoning and inductive reasoning?** (SWL, AJK, 2018) (MLN, GI, BWP, 2019)

Ans.

Deductive Reasoning	Inductive Reasoning
Deductive reasoning is reasoning from the general to the specific. It involves drawing specific conclusion from some general principle/assumptions. Deductive logic of "if — then" is frequently used to frame testable hypothesis.	It is reasoning from the specific to the general. It begins with specific general principle.
Example: If we accept that all birds have wings (premise 1), and that sparrows are birds (premise 2), then we conclude that sparrows have wings.	**Example:** If we know that sparrows have wings and are birds, and we know that eagle, parrot, hawk, crow are birds; then we conclude that all birds have wings.

33. **Define Social Biology.** (BWP, 2019)

Ans. **Social Biology:** Study of social behavior and communal life of living organisms especially human being.

34. **Differentiate ecosystem and community.** (AJK, 2019)

Ans. **Differences between Ecosystem and Community:**

Ecosystem	Community
i. Ecosystem is all biotic and abiotic factors of a particular environment that interact with each other.	i. Community is a group of organisms living in a particular environment with several common characteristics.
ii. A broader level than a community.	ii. Comprises only the biotic factors in an ecosystem.
iii. Examples include forests, grassland ponds and estuaries.	iii. Include the collection of plants, animals and microorganisms in a particular ecosystem.

ESSAY TYPE QUESTIONS

Q1. **Define the following branches of Biology:** (AJK, GI, 2016)
  i. **Microbiology** ii. **Histology**
  iii. **Marine Biology** iv. **Biotechnology**

Q2. **Differentiate between deductive and inductive reasoning with examples.** (LHR, GI, FBD, GI, BWP, GI, MLN, GI, 2014) (DGK, GI, 2015)

Q3. **What is hypothesis? Discuss briefly the deductive and inductive reasonings.** (BWP, GII, 2017)

Q4. **Explain the biological method for solving a biological problem.** (GRW, GI, 2017) (MLN, GII, 2018) (MLN, GI, 2019)

Q5. **How study of Biology helped mankind to improve production of food?** (SGD, GII, 2015) (DGK, GI, GRW, GI, 2016) (AJK, BWP, 2019)

Q6. **Describe the role of Biology in the field of health.** (MLN, GI, 2016)

****

Biological Molecules

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. **The percentage of water in bacterial cell is about:** (BWP. GI, 2014) (LHR. GI, 2016) (AJK. 2018) (MLN. GII, 2019)
   (A) 15% (B) 18% (C) 50% **[C]** 70%
2. **Globular proteins differ from fibrous proteins in:** (LHR. GI, 2015)
   (A) Having amino acids (B) Their repeating units joined by peptide bond
   [C] Being soluble in aqueous medium (D) Being non-crystalline
3. **Which of the following kinds of atoms do not occur in the carbohydrates?** (FBD. GI, 2014)
   (A) Carbon (B) Hydrogen **[C]** Nitrogen (D) Oxygen
4. **Th potential source of chemical energy for cellular activities:** (DGK. GI, 2015)
   [A] C-H bond (B) C-N bond (C) C-O Bond (D) C-C bond
5. **The basic element of organic compound is:** (AJK. GI, 2016)
   (A) Hydrogen **[B]** Carbon (C) Nitrogen (D) Oxygen
6. **The amount of heat absorbed when liquid changes into gas, is expressed as calories per gram vaporized is called:** (LHR. GI, 2016)
   (A) Heat Capacity (B) Specific Heat **[C]** Heat of Vaporization (D) Latent Heat
7. **Human tissues have 85% water in cells of:** (GRW. GII, 2014) (FBD. GI, 2019)
   [A] Brain (B) Bone (C) Blood (D) liver
8. **The specific heat of vaporization of water is:** (GRW. GI, 2015) (LHR. GI, 2017) (RWP. 2019)
   (A) 457 kcal/kg **[B]** 574 kcal/kg (C) 547 kcal/kg (D) 475 kcal/kg
9. **Carbon is:** (GRW. 2014)
   (A) Divalent (B) Trivalent (C) Monovalent **[D]** Tetravalent
10. **The sequence of amino acids in a protein molecule was determined by:** (RWP. GI, 2015)
    (A) E. Chatton (B) F. Meischer **[C]** F. Sanger (D) J. Watson
11. **Our blood normally contains ________ glucose.** (MLN. GI, RWP. GI, 2014) (MLN. GI, 2019)
    (A) 0.6% (B) 0.8 % (C) 0.06% **[D]** 0.08%
12. **The chief form of carbohydrates stored in animal body is:** (SGD. GII, 2014)
    (A) Starch **[B]** Glycogen (C) Cellulose (D) Glucose
13. **Most of cellular secretions are in nature:** (SGD. GI, 2016) (MLN. GI, 2018)
    (A) Proteins (B) Lipids (C) Carbohydrates **[D]** Glycoproteins
14. **Which one of the following is not a lipid?** (SWL. GI, 2016)
    (A) Rubber **[B]** Chitin (C) Cutin (D) Cholesterol
15. **The alpha chain of haemoglobin has amino acids:** (FBD. GI, 2017)
    (A) 174 (B) 171 **[C]** 141 (D) 146
16. **The most abundant ganic compound in mammalian cell:** (FBG. GI, 2015)
    (A) Water **[B]** Proteins (C) Carbohydrates (D) Lipids
17. **Substances, which on hydrolysis, yield polyhydroxy aldehyde or ketone sub-units:** (MLN. 2016) (MLN. 2017)
    (A) Acylglycerol (B) Polypeptides **[C]** Carbohydrates (D) Nucleic acids

18. **The molecule formed by two amino acids is called:** (GRW. GI, 2016)
(A) Peptide linkage (B) Dipeptide (C) Peptide bond (D) Both A&C

19. **The % age of RNA in a cell is:** (MLN. GI, 2016)
(A) 3-4% (B) 40-50% (C) 80% (D) 10-20%

20. **The compound formed by combination of a nitrogen base and a pentose sugar is called:** (MLN. GI, 2016)
(A) Nucleotide (B) Nucleoside (C) Polypeptide (D) Polysaccharide

21. **Keratin is an example of Fibrous protein present in:** (LHR. GI, 2016)
(A) Nails (B) Blood (C) Muscles (D) Bones

22. **Dextrin, Agar, Pectin and Chitin are:** (BWP. GII, 2014)
(A) Carbohydrate (B) Lipid (C) Protein (D) Nucleic Acid

23. **Amino acids are linked to each other by:** (DGK. GI, 2016)
(A) Ester bond (B) Glycosidic bond (C) Hydrophobic bond (D) Peptide bond

24. **Which type of bond is not formed in maintaining tertiary structure of proteins?** (DGK. GI, 2014)
(A) Ionic (B) Hydrogen
(C) Disulfide (D) Hydrophobic interactions

25. **Conjugated histone proteins are:** (MLN. GI, 2015)
(A) Structural and Regulatory (B) Structural Only
(C) Regulatory only (D) Transport proteins

26. **Most abundant carbohydrate in nature is:** (GRW. 2019)
(A) starch (B) glycogen (C) cellulose (D) agar

27. **Glycogen gives colour with iodine:** (SGD. 2019)
(A) Black (B) Red (C) Blue (D) Green

28. **The percentage of water in human bone cells is :** (BWP. 2018)
(A) 18 % (B) 19 % (C) 20 % (D) 25 %

29. **Total number of amino acid in insulin are:** (LHR. GII. 2019)
(A) 51 (B) 141 (C) 151 (D) 50

30. **Human tissue contains about 20% water in:** (GRW. 2019)
(A) brain cells (B) bone cells (C) kidney (D) skin cells

31. **Percentage of carbohydrates in mammalian cell is:** (DGK. 2019)
(A) 1% (B) 2% (C) 3% (D) 4%

32. **Number of amino acids in each turn of α-helix is:** (FBD. GII, 2019)
(A) 3 (B) 3.6 (C) 0.36 (D) 36

33. **Which of the following is a lipid:** (AJK. 2019)
(A) Chitin (B) Rubber (C) Starch (D) Sucrose

SHORT ANSWER QUESTIONS

1. **What is Biochemistry? Give its importance.** (GRW. GI, 2014) (GRW. GII, FBD. GI, 2015)

Ans. Biochemistry: Biochemistry is a branch of Biology, which deals with the study of chemicals components and the chemical process in living organisms.

Importance: A Basic knowledge of biochemistry is essential for understanding anatomy and physiology, because all of the structures of an organism have biochemical organization, e.g., photosynthesis, respiration, digestion, muscles contraction etc. can be described in biochemical terms.

2. **Define Metabolism and name its two processes.** (RWP. GI, 2017)

Ans. **Metabolism:** All the reactions taking place in the cells are collectively called metabolisms.

Processes: Anabolism and catabolism are two processes of metabolism.

3. **What is heat capacity of water? Give its importance.** (LHR. GII, 2016) (MLN. GII, DGK. GI, 2018)

Ans. **Heat Capacity of Water:** Water has great ability of absorbing heat with minimum change in its own temperature.

The specific heat capacity of water is the number of calories required to raise the temperature of 1g of water by 1°C (from 15°C to 16°C) i.e. 1.0. This is because much of the energy is used to break hydrogen bonds.

Importance of Heat Capacity of Water: Water works as temperature stabilizer for organisms in the environment and hence protects living material against sudden thermal changes.

4. **Define protective role of water.** (GRW. GI, 2017) (FBD. GI, 2019)

Ans. **Protective role of water:** Water is an effective lubricant. It protects the body from damages by friction. For example, tear protects eye surface from rubbing of eyelids. Water form a liquid cushion around organs and protect them from trauma.

5. **Give four functions of proteins.** (RWP. GI, 2015)

Ans. **Functions of proteins:**

i. **Building function:** They build many structures of the cell e.g., cell membrane.

ii. **Enzymes:** All enzymes are proteins and in this way they control the whole metabolism of the cell e.g., pepsin etc.

iii. **Hormones:** As hormone, proteins regulate metabolic process e.g., insulin.

iv. **Transport:** Some proteins are carriers and transport specific substances such as oxygen, lipids, and metal ions etc., e.g., hemoglobin.

6. **What are lipids? Give two functions of waxes.** (MLN. GI, 2014) (DGK. GII, 2015) (AJK. 2016)

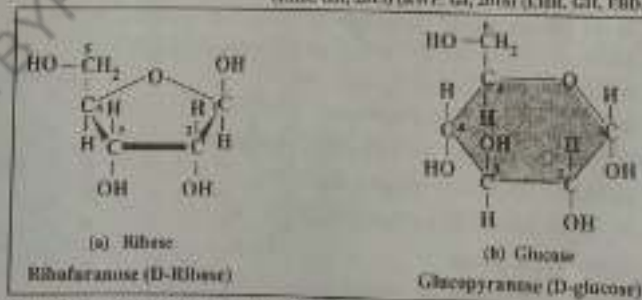
Ans. **Lipids:** The lipids are the heterogeneous group of compounds related to fatty acids are insoluble in water but soluble in organic solvents such as ether, alcohol, chloroform and benzene etc. lipids include fat, oil, waxes, cholesterol and related compounds.

Function of waxes:

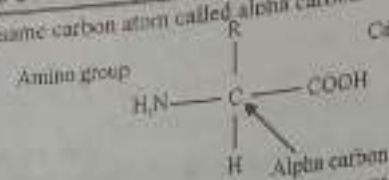
i. Waxes are wide spread as protective coatings on fruits and leaves.

ii. Waxes protect plants from water loss and abrasive damage.

7. **Sketch Ribofuranose (D-Ribose) and Glucopyranose (D-Glucose).** (LHR. GII, 2015) (RWP. GI, 2016) (LHR. GII, FBD. 2018) (GRW. 2019)

Ans.

8. **How amino acids differ from each other?** (MLN. GII, 2016)

Ans. All the amino acids have an amino group $(-NH_2)$ and a carboxyl group $(-COOH)$

attached to the same carbon atom called alpha carbon. Their general formula is give below.

R-Group: R may be hydrogen atom as in glycine or CH_3 as in alanine or any other group. So amino acids mainly differ on the R – group.

9. Differentiate between saturated and unsaturated fatty acid. (LHR. GI, SGD. GI, 2018)

Ans.

Saturated Fatty Acid	Unsaturated Fatty Acid
Saturated fatty acid contains no double bond between carbon and carbon in a molecule.	Unsaturated fatty acid may contain up to 6 double between carbon and carbon in a molecule
Saturated fatty acids are present in **fats.** That's why fats are **solid** at room temperature.	Unsaturated fatty acids are present in oils that's why oils are **liquid** at room temperature.
Example: Palmitic acid.	**Example:** Oleic acid.

10. How many chains of amino acids are present in hemoglobin, also mention number of amino acids in hemoglobin. (MLN. GI, 2015)

Ans. There are four chains in hemoglobin two alpha and two beta chains, total amino acids are 574.

11. What are lipids? Write its importance. (AJK. GI, 2016)

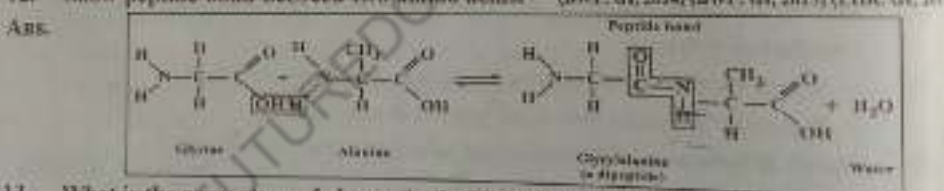
Ans. Lipids: Lipids are insoluble in water but soluble in organic solvents such as ether, alcohol, chloroform and benzene.

Importance of Lipids: Lipids constitute major source of energy, and play an important role in the structure of membranes of the cell and of organelles found in the cell. Lipids provide insulation, mechanical protection and protection from water loss and abrasive damage.

12. Show peptide bond between two amino acids. (BWP. GI, 2014) (BWP. GI, 2015) (LHR. GI, 2017)

Ans.

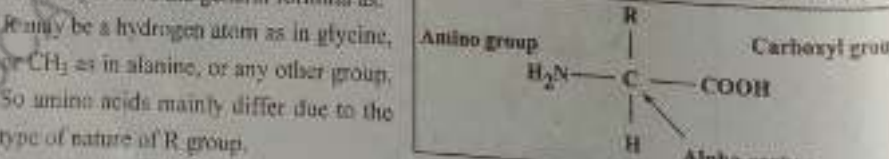
Peptide bond

Glycine + Alanine ⇌ Glycylalanine (a dipeptide) + H_2O (Water)

13. What is the percentage of glucose in the blood of a healthy person? (AJK. GII, 2016)

Ans. The percentage of glucose in the blood of a healthy person is 0.08.

14. Give general formula for an Amino Acid. (DGK. GII, 2016) (MLN. GI, 2017)

Ans. Amino acids have the general formula as: R may be a hydrogen atom as in glycine, or CH_3 as in alanine, or any other group. So amino acids mainly differ due to the type of nature of R group.

Amino group — R — H_2N — C — COOH — H — Carboxyl group — Alpha carbon

15. What F. Sanger concluded about insulin? (LHR. GII, 2017)

Ans. Sequence of Insulin molecule: F. Sanger determines the sequence of first protein molecule. Sanger worked on insulin for ten years. He found that insulin is composed of 51

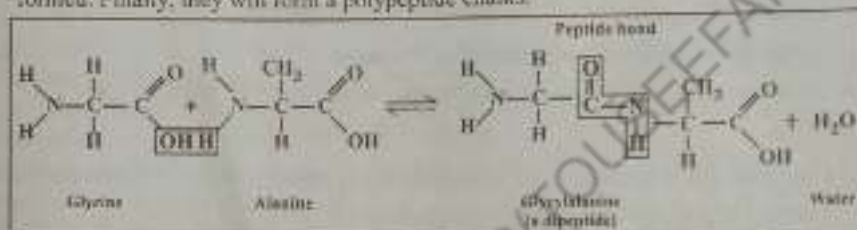
amino acids. It has two chains of amino acids. One chain has 21 amino acids. The other chain has 30 amino acids. Both these chains are held together by disulphide bridges (bonds).

16. How the peptide bonds are formed? (DGK. GII, 2017)

Ans. Formation of Proteins from Amino Acids: Amino acids are linked to form polypeptide chain. The amine group of one amino acid reacts with the carboxyl group of another amino acid and C-N bond is formed. The C-N bond is called peptide bond. Water is released during peptide bond formation.

For example, glycine and alanine may combine to form glycylalanine. It has two amino acid units. Thus it is called dipeptide. A dipeptide has again an amino group at one end and a carboxyl group at the other end. So both reactive parts are again available for further peptide bond formation. In this way, tripeptide, tetrapeptide and pentapeptide etc. are formed. Finally, they will form a polypeptide chains.

Peptide bond

Glycine + Alanine ⇌ Glycylalanine (a dipeptide) + H_2O Water

17. What are Globular proteins? Give examples. (MLN. GI, 2017)

Ans. Globular Proteins: They have multiple folding of polypeptide. So rather chains are spherical or ellipsoidal. Tertiary structure is the most important in them. They are soluble in aqueous media such as salt solution, solution of acids or bases or aqueous alcohol. They can be crystallized. They disorganize with the change in the physical and physiological environment.

Examples: Enzymes, antibodies, hormones and haemoglobin.

18. Why lipids store double amount of energy as compared to the same amount of any carbohydrate? (SWL. GII, 2014)

Ans. Lipids store double amount of energy as compared to the same amount of any carbohydrate because they have higher proportion of C – H bonds and very low proportion of oxygen.

19. Define heat of vaporization. What is heat of vaporization of water? (RWP. GII, 2015) (LHR. GI, 2018)

Ans. Heat of vaporization: The amount of heat energy that must be supplied to change one gram of a substance from liquid phase to the vapor phase is called heat of vaporization.

The heat of vaporization of water is 574 kcal/kg (1 kilo calories = 1000 calories).

20. Differentiate between Heat Capacity and Heat of Water Vaporization. (RWP. 2018)

Ans. Heat Capacity of Water: The specific heat capacity is defined as the number of colories required to raise the temperature of 1 g of water by 1°C (from 15 to 16 °C).

The specific heat capacity of water is 1.0.

Heat of Water Vaporization: Heat of water vaporization is shown as calories absorbed per gram water vaporized. It means to convert 1g of water to 1g of steam at 100°C.

The specific heat of vaporization of water is 574 KCal/kg (1 kilo-calories = 1000 calories).

21. **What are conjugated compounds?** (LHR. GI, 201?)

Ans. Two different molecules, belonging to different categories, usually combine together to form conjugated molecules.

22. **Define protective role of water.** (FBD. GI, 201?)

Ans. **Role:** Water is effective lubricant that provides protection against damage resulting from friction.

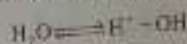
For example: Tears protect the surface of eye from the rubbing of eyelid water also form a fluid cushion around organ that helps to protect them from trauma.

23. **Define heat capacity.** (FBD. GII, 201?)

Ans. **Heat Capacity:** Water has great ability of absorbing heat with minimum of change in its own temperature. The specific heat capacity of water. The number of calories required to raise the temperature of 1g of water from 15 to 16°C is 1.0. This is called specific heat capacity of water.

24. **What do you know about ionization of water?** (DGK. 201?)

Ans. **Ionization of Water:** The water molecule ionize to form H^+ and OH^- ions.

$$H_2O \rightleftharpoons H^+ + OH$$

This reaction is reversible but on equilibrium is maintained. At 25°C the concentration of each of H^+ and OH^- ion in pure water is about 10^{-7} mole.

ESSAY TYPE QUESTIONS

Q1. **Give importance of Carbon in Skeleton of life.** (DGK. GII, 2016) (SGD. 201?)

Q2. **Discuss water as medium of life. Also give its importance.** (LHR. GI, 2014) (LHR. GII, SWL. GI, DGK. GI. 2015) (SGD. GI, 2016) (RWP. GI, 201?)

Q3. **Describe any four properties of water.** (LHR. GI, 201?)

Q4. **Give importance of water in nature.** (DGK. GI, 2017) (MLN. GI, 201?)

Q5. **Describe primary and secondary structure of protein.** (SGD. GI, 2014) (SGD. GII, 2015) (FBD. GI, AJK. GI, 2016) (SWL. GI, 201?) (SWL, SGD, DGK. GII, 2018) (LHR. GI, GRW, MLN. GII, 201?)

Q6. **What functions are performed by proteins in the bodies of living organisms?** (SGD. GI, 2015) (RWP. GI, 201?)

Q7. **Classify proteins according to their structure.** (RWP. GI, 201?)

Q8. **Write down any eight functions of proteins.** (GRW. GII, 201?)

Q9. **Describe fibrous and globular proteins.** (SWL. GI, 2016) (RWP. GII, 2017)

Q10. **Describe secondary and tertiary structure of protein.** (MLN. GI, 201?)

Q11. **Describe importance of Water by discussing its various properties.** (RWP, 201?)

****

CHAPTER 03

Enzymes

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. **If the non-protein part of enzyme is covalently bonded, it is called:** (SGD. GII, 2015) (RWP. GI, 2016) (DGK. 2019)
   (A) Co-factor (B) Activator (C) Co-enzyme **(D) Prosthetic group**
2. **The detachable cofactors of an enzyme is known as:** (GRW. GII, 2014) (RWP. 2015)
   (A) Activator (B) Prosthetic group (C) Coenzyme (D) Apoenzyme
3. **Enzyme that produces amino acids:** (MLN. GI, 2015)
   (A) Trypsin (B) Erypsin (C) Chymotrypsin **(D) Amino peptidases**
4. **The activation energy of the reactions is lowered by:** (RWP. GI, AJK. GI, 2016)
   (A) Co-enzyme **(B) enzyme** (C) substrate (D) product
5. **Enzymes involved in respiration, are found in:** (MLN. GI, 2014) (MLN. GI, 2018)
   (A) Chloroplasts (B) Ribosome **(C) Mitochondria** (D) Nucleus
6. **Biologically active proteins:** (SWL. GI, 2017)
   (A) Glycoproteins **(B) Enzymes** (C) Activators (D) Inhibitors
7. **Metals ions are related to:** (GRW. GI, 2015)
   (A) Coenzymes (B) Vitamins **(C) Cofactors** (D) Substrate
8. **The vitamins are essential raw material for the synthesis of:** (SWL. GI, 2014) (LHR. GII, 2017)
   (A) Activators (B) Co-factors **(C) Co-enzymes** (D) Prosthetic group
9. **Coenzymes are closely related to:** (MLN. GI, 2016) (FBD. GI, 2019)
   (A) Amino acids (B) Non protein particles **(C) Vitamins** (D) Enzymes
10. **The non-protein part of enzyme is known as:** (GRW. GI, 2017)
    (A) Activator (B) Co-enzyme **(C) Co-factor** (D) Polypeptides
11. **Enzyme lowers down the energy of:** (GRW. GI, 2016)
    (A) Kinetic (B) Potential **(C) Activation** (D) Ionic
12. **Lock and key model was proposed by:** (FBD. GI, 2014) (RWP. GI, 2015) (MLN. GI, 2019)
    (A) Emil Fischer (B) Koshland (C) Rudolph Virchow (D) Lorenz Oken
13. **Enzymes that are integral part of ribosome are responsible for synthesis of:** (RWP. GII, 2016)
    (A) Lipids **(B) Proteins** (C) Carbohydrates (D) Nuceic acids
14. **All enzymes are globular:** (SGD. GI, 2014)
    (A) Carbohydrates (B) Lipid (C) Nucleic acid **(D) Protein**
15. **Reversible inhibitors form weak linkages with the:** (SGD. GI, 2016)
    (A) Enzyme (B) Reactant (C) Product (D) Substrate
16. **Induced fit model was proposed by:** (LHR. GI, 2015) (SGD. GI, 2016)
    (A) Emil Fischer **(B) Koshland** (C) Jenner (D) Pasteur
17. **Poisons like cyanide, antibiotics, anti-metabolites and some drugs are examples of:** (FBD. GI, 2016) (GRW. 2018)
    (A) Enzymes **(B) Inhibitors** (C) Coenzyme (D) Holenzymes
18. **All enzymes are proteins:** (MLN. GI, 2017) (AJK. 2018)
    (A) Fibrous **(B) Globular** (C) Non-enzymatic (D) None
19. **The catalytic activity of enzyme is restricted to a small portion of the enzyme, known as:** (MLN. GI, 2014)
    (A) Active site (B) Catalytic site (C) Binding site (D) Reacting site

20. **The reversible inhibitors have:** (BWP. GII, 2014)
(A) Strong linkage with enzyme
(B) Weak linkage
(C) No linkage
(D) Medium linkage

21. **According to Lock and Key Model, the active site is:** (LHR. GII, 2015) (DGK. GII, 2016) (AJK. GI, 2017) (MLN. GII, 2016)
(A) Rigid structure (B) Flexible (C) Liquid (D) All of these

22. **Extreme changes in pH cause the bonds in enzyme to break resulting in the:** (BWP. GI, 2014)
(A) Activation of Enzyme
(B) Inhibition of Enzyme
(C) Denaturation of Enzyme
(D) None of these

23. **If protein part of co-factor is covalently bonded to enzyme, it is called as:** (SWL. 2018)
(A) co-enzyme **(B)** prosthetic group (C) activator (D) apoenzyme

24. **Irreversible inhibitors form which bonds with active site?** (MLN. GII, 2019)
(A) Hydrogen bonds
(B) Covalent bonds
(C) Ionic bonds
(D) Hydrophobic bonds

SHORT ANSWER QUESTIONS

1. **Define enzymes.** (AJK. GI, 2015) (GRW. GI, 2016)

Ans. **Enzymes:** Enzymes are biochemical catalysts which increase the rate of reaction by lowering the activation energy of the reaction. They are very specific in their action and are globular protein in nature.
Examples: Pepsin, Amylase etc.

2. **Give role and examples of enzymes activator.** (SWL. GI, 2014)

Ans. **Enzyme Activator:** The detachable co-factor is known as an activator.Sometime the co-factor provide a source of chemical energy, helping to derive reactions which would otherwise difficult. it is inorganic metal ions.
Examples: Mg^{2+}, Fe^{2+}, Zn^{2+} etc.

3. **Differentiate between apoenzyme and holoenzyme.**
(LHR. GI, GRW. GI, 2014) (LHR. GII, GRW. GII, MLN. GI, BWP. GI, 2015) (LHR. GII, MLN. GI, SWL. GI, 2016) (LHR. GI, DGK. GII, BWP. GI, MLN. GII, 2017) (MLN. GI, GII, SGD, BWP, 2018) (GRW, MLN. GII, 2019)

Ans.

Apoenzyme	Holoenzyme
An enzyme with its coenzyme or prosthetic group removed is known as an apoenzyme.	An activated enzyme, consisting of polypeptide chain and a co-factor is known as a holoenzyme.

4. **What are cofactor and activator of enzyme?** (FBD. GI, DGK. GI, 2015)
(LHR. GII, SWL. GI, SGD. GI, 2016) (FBD. GI, SWL. GI, BWP. GI, 2017) (SGD. 2019)

Ans. **Co-Factor:** Co-factor is a non-protein part which is essential for the proper functioning of the enzyme. Cofactor provides a source of chemical energy, helping to drive reactions which would otherwise be difficult or impossible.
Activator: The detachable cofactor is known as an activator. It is inorganic metal ions used by enzymes for their proper functioning, e.g., Mg^{2+}, Fe^{2+} etc.

5. **Give differences between prosthetic group and activator.**
(LHR. GII, 2015) (LHR. GI, SGD. GI, 2016) (LHR. GI, BWP. GI, 2017)

Ans.

Prosthetic Group	Activator
It is a co-factor which is covalently bonded with the enzyme. Without prosthetic group, holoenzyme becomes an apoenzyme.	It is a cofactor which is in the form of inorganic metal ion required for the proper functioning of the enzyme. An activator is also a non protein part of the enzyme.

6. What are enzymes and coenzymes? (GRW. GI, 2016) (MLN. GII, 2017) (MLN. GII, 2019)

Ans. **Enzymes:** Enzymes are the most important group of proteins which are biologically active. They tremendously increase the efficiency of a biochemical reaction and are specific for each type of reaction without these enzymes the reaction would proceed at a very slow speed making life impossible.

Coenzymes: Coenzymes are non-protein part. That is loosely attached to the protein part of enzyme.

It is closely related to vitamins, which represent the essential raw materials from which coenzymes are made. Only small qualities of vitamins are needed because, like enzymes, co-enzymes can be used again and again.

7. How does an enzyme accelerate a metabolic reaction? (LHR. GI, 2014)

Ans. Enzyme lowers the amount of activation energy needed. The reduction in activation energy, by the enzyme, accelerates a metabolic reaction.

8. Differentiate between Co-factor and Co-enzyme. (DGK. GI, AJK. GI, 2016)

Ans.

Co-factor	Co-enzyme
Co-factor are non-protein part of some enzymes which are essential for the proper functioning of the enzymes. They usally act as a bridge between enzymes and their substrates.	Co-enzyme is a co-factor which is closely attached with enzyme forming no covalent bond with it. It is closely related to vitamins as vitamins are essential for their synthesis.

9. How is Prosthetic group different from Coenzyme?
(GRW. GI, 2016) (LHR. GII, GRW. GI, 2017) (LHR. GII, SWL, SGD. AJK. 2019)

Ans.

Prosthetic group	Co-enzyme
Prosthetic group is a cofactor which forms covalent bond with the enzyme and hence is tightly attached. It is not closely related to vitamins.	Co-enzyme is cofactor which is loosely attached with the enzyme forming no covalent bond with it. It is closely related to vitamins and has vitamins as its part.

10. What Koshland proposed in 1959? (SGD. GI, 2015)

Ans. Koshland proposed in 1959 Induced Fit Model of Enzyme Action.

11. Differentiate between co-factor and activator. (RWP. GI, 2016)

Ans.

Co-factor	Activator
Co-factor is non-protein part of enzyme which assists the enzyme in catalysis and often acts a bridge between enzyme and substrate.	Activator is a detachable cofactor. It is either activator ion or inorganic metal ion such as Mg^{2+}, Fe^{2+}, Cu^{2+}, Zn^{2+} etc.

12. What is active site of an enzyme? How it works?
(RWP. GI, DGK. GI, 2015) (SWL. GI, SGD. GI, 2016) (MLN. GI, 2019)

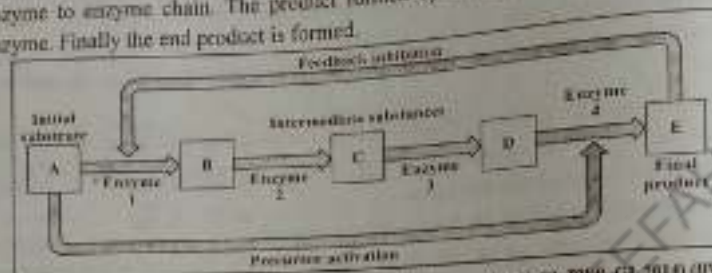
Ans. **Active Site:** "The active site of an enzyme is a small portion of the globular structure to which catalytic activity is restricted".

Work: An active site determines the specificity of enzymes. The charge and shape of active site is formed by some amino acid present in the polypeptide chain of enzyme. The active sites of an enzyme is made up of two definite regions.

i. Bindi-ng site

ii. Catalytic site

13. How enzymes catalyse series of chemical reactions? (SGD. GI, 2017)

Ans. In some cases, enzymes catalyse in series or chains. These enzymes are present in a specific reaction. One enzyme hands over the substrate to an other enzyme, forming an enzyme to enzyme chain. The product formed by an enzyme is transferred to the next enzyme. Finally the end product is formed.

14. Write down any four characteristics of enzyme. (MLN. GI, BWP. GI, 2014) (BWP. GI, 2015) (DGK. GI, BWP. GI, 2016) (MLN. GI, BWP. GII, BWP. GI, 2017) (SWL. 2019)

Ans. Characteristics of Enzymes:

i. Enzymes are biochemical catalysts which are globular protein in nature.
ii. Enzymes lower the activation energy of the reactions.
iii. Enzymes are very specific in their action.
iv. Enzymes increase the rate of reaction without themselves being used up.

15. What is enzyme to enzyme chain? (SWL. GI, 2014) (SGD. GI, 2016) (LHR. GI, 2019)

Ans. Enzyme to Enzyme Chain:

i. In certain cases enzymes act in a series of chemical reactions in a particular order to complete a metabolic pathway such as respiration or photosynthesis.
ii. The successive enzymes containing the reactions are present normally together in a precise order of reaction such that substrate molecules can be literally handed on from one enzyme to another forming an enzyme to enzyme chain.
iii. In this way, the products from one step in pathway are transferred to the enzyme catalyzing the next step.

16. Define Koshland model of enzyme action.
(FBD. GI, SWL. GI, SGD. GI, 2014) (LHR. GII, SGD. GI, BWP. GI, 2015)
(LHR. GI, GRW. GII, MLN. GI, DGK. GII, AJK. GI, 2016) (LHR. GII, FBD. GI, DGK. GII, 2017)

Ans. Induced Fit Model: Induced fit Model was proposed by Koshland in 1959.
According to this model, enzyme active site is flexible. When a substrate combines with an enzyme, it induces changes in the enzyme structure. The change in structure enables the enzyme to perform its catalytic activity more effectively.

17. Why some enzymes are produced in the inactive form? Give example. (SGD. GI, 2016)

Ans. Some enzymes are potentially damaging if they are manufactured in their active form, so they are produced in their inactive form.
Example: Pepsin is powerful protein-digesting enzyme and is quite capable of destroying cells internal structure and thus is produced in inactive **pepsinogen** form by the cell. It is converted in its active form only in the digestive tract where it is required to be active.

18. What is lock and key model? Who proposed this model?
(SGD. GI, 2016) (GRW. GI, MLN. GII, RWP. GI, BWP. GI, 2017)
(GRW. SWL. 2018) (LHR. GI, FBD. GII, SGD. 2019)

Ans. Lock and key Model: Lock and key model was proposed by Emil Fischer in 1890.
According to this model, as one specific key can open only a specific lock, in the same manner, a specific enzyme can transform only one substrate into products.

According to this model, the active site is a rigid structure.There is no modification or flexibility in the active site before, during or after the enzyme action. Active site used only as a template.

19. How irreversible inhibitors inhibit enzyme activity? (FBD. GI, 2014)

Ans. Mechanism of Irreversible Inhibitors: Irreversible inhibitors check the reaction rate by occupying the active sites or destroying the globular structure. They occupy the active site by forming covalent bonds or they may physically block, the active sites.

20. What are enzyme inhibitors? Give their major types.
(LHR. GI, GRW. GII, FBD. GI, SGD. GI, 2014) (LHR. GI & GII, GRW. GII, RWP. GI, 2015)
(LHR. GI, 2016) (DGK. GI, 2017) (AJK, SGD, 2018) (FBD. GI, 2019)

Ans. Inhibitors: "An inhibitor is a chemical substance which can react, in place of substrate with the enzyme but is not transformed into product and this blocks the active site temporarily or permanently."

Examples: Poisons like cyanides, antibiotics, antimetabolites and some drugs.

Major types of inhibitors: There are two major types of inhibitor as under:

i. Irreversible inhibitors ii. Reversible inhibitors

21. Differentiate between reversible and irreversible enzyme inhibitors.
(RWP. GI, 2014) (AJK. GI, GRW. GI, 2015) (GRW. GI, RWP. GI, 2016) (DGK. GII, 2018)

Ans.

Reversible Inhibitors	Irreversible Inhibitors
Reversible inhibitors form weak linkages with enzyme. Their effect can be neutralized completely partly by an increase in the concentration of the substrate.	Irreversible inhibitors check the reaction rate by occupying the active sites or destroying the globular structure. They occupy the active sites by forming covalent bonds or they may physically block the active sites.

22. What are competitive and non-competitive enzyme inhibitors?
(FBD. GI, SGD. GI, DGK. GII, RWP. GI, 2015) (MLN. GI, DGK. GII, RWP. GI, 2016)
(LHR. GI, MLN. GI, SWL. GI, RWP. GII, RWP. GI, 2017) (GRW. RWP. 2018) (RWP. 2019

Ans. Competitive Inhibitors: Competitive inhibitors because of the structural similarity with substrate may be selected by the binding sites, but are not able to activate the catalytic sites. Thus product is not formed.

Non-competitive Inhibitors: Non-competitive inhibitors form enzyme inhibitor complex at a point other than the active site. They alter the structure of the enzyme in such a way that even if genuine substrate binds the active site, catalysis fails to take place.

23. Differentiate between substrate and active site of enzymes. (LHR. GI, 2015)

Ans.

Substrate	Active Site
The reactant attached to the active site is called substrate.	Active site is a small portion of the enzyme to which the catalytic activity is restricted.

24. What is induced fit model of enzyme action, who proposed it?
(LHR. GI, FBD. DGK. GII. 2018) (GRW. AJK. 2019)

Ans. Induced Fit Model of Enzyme Action: Koshland (1959) proposed Induced Fit model of enzyme action. He argued that when a substrate combines with an enzyme, it induces changes in the enzyme structure. The structure in enzyme enables the enzyme to perform its catalytic activity more effectively.

25. Differentiate between competitive and non-competitive inhibitors. (LHR. GII, RWP, 2018)

Ans.

Competitive inhibitors	Non - Competitive inhibitors
The competitive inhibitors are reversible inhibitors. They may be selected by the binding sites due to the structural similarity with the substrate. They are not able to activate the catalytic sites. Thus products (S) are not formed.	They form enzyme inhibitor complex at a point other than the active site. They alter the structure of the enzyme in such a way that even if genuine substrate binds the active site, catalysis fails to take place.

26. What is an apoenzyme? (FBD. 2018) (FBD. GII, 2019)

Ans. Apoenzyme: An enzyme without its coenzyme, or prosthetic group is called as apoenzyme.

27. Differentiate between Binding site and Catalytic site of an enzyme. (MLN. GI, 2018) (SWL. 2019)

Ans.

Binding Site	Catalytic Site
Binding site is a definite region of active site of an enzyme which helps the enzyme in the recognition and binding of a proper substrate to produce an ES complex.	Catalytic site is a definite region of active site of an enzyme which catelyses the transformation of the substrate into products (s).

28. Compare Pepsin with Pepsinogen.
(SGD. 2014) (LHR. GI, RWP, GI, 2017) (MLN. GII, 2018) (FBD. GI, RWP, 2019)

Ans.

Pepsin	Pepsinogen
Pepsin is an enzyme that breaks down proteins into smaller peptides.	Pepsinogen is an inactive form of pepsin.

29. Define co-factor. What is its function? (SWL. 2018)

Ans. Co-factor: A co-factor is a non-protein part present in some enzymes. It is necessary for the proper functioning of the enzymes. The co-factor usually acts as "bridge" between the enzyme and its substrate. Often, it contributes directly to the chemical reactions which bring about catalysis.

Function: Sometimes, the co-factor provides a source of chemical energy, helping to drive reactions which would otherwise be difficult or impossible.

30. Differentiate between activator and coenzyme. (SWL. 2018)

Ans.

Activator	Co-enzyme
The detachable co-factor is known as an activator if it is an organic ion.	If non-protein part is loosely attached to the protein part or enzyme it is known as co-enzyme.

31. What are enzymes? Give their importance? (SGD. 2018)

Ans. Enzymes: Enzymes are the most important group of proteins. They are composed of hundreds of amino acids.

Importance: Enzymes are biologically active and greatly increase the efficiency of a biochemical reaction. They are specific for each type of reaction. The reaction would proceed at a very slow speed without them.

32. Define activators. Give examples. (RWP, DGK. GII, 2018) (MLN. GII, 2019)

Ans. Activators: An activator is a chemical substance which can react (in place of substrate) with the enzyme but is not transformed into products (s) and thus blocks the active site temporarily or permanently.

Example: Example of inhibitors are poisons, like cyanide, antibodies, antimetabolites and some drugs.

33. **Define active site and also mention its sites.** (RWP. 2018)

Ans. Active Site: Active site is a small portion of the enzyme to which the catalytic activity is restricted.

Sites of Active Site:

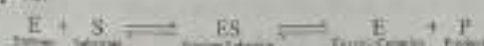
i. The reactant called substrate is attached to the active site.

ii. The active site consists of only a few amino acids.

iii. Rest of the bulk of the amino acids maintain the globular structure of the enzyme.

34. **How enzyme substrate complex is formed?** (LHR. GII, 2019)

Ans. Substrate Complex:

$$E + S \rightleftharpoons ES \rightleftharpoons E + P$$

35. **What are reversible inhibitors?** (FBD. GI, 2019)

Ans. Reversible Inhibitors: They form weak linkage with the enzyme. Their effects can be neutralized completely or partly by an increase in the concentration of the substrate.

Two major types: i. Competitive ii. Non-Competitive

Competitive Inhibitors: Because of the structural similarity with the substrate they may be selected by the binding site but are not able to active catalytic side. Thus product are not formed.

Non-Competitive: They form enzyme inhibitor complex at a point other than the active site. They alter the structure of the enzyme in such a way if genuine substrate binds the active site, catalysis fails to take place.

36. **Define co-factor. Write its function.** (DGK. GI, 2018) (DGK. 2019)

Ans. Co-factor: Some enzymes consists solely of proteins. Other also have a non-protein part known as a co-factor which is essential for the proper functioning of the enzyme. The co-factor act as "bridge" between the enzyme and its substrate often it contribute directly to the chemical reactions which bring about catalysis. Sometime the co-factor provide a source of chemical energy.

37. **What are competitive inhibitors? Why they are called reversible inhibitors?** (DGK. 2019)

Ans. Competitive Inhibitors: Competitive inhibitors because of the structural similarities with the substrate they may be selected by the binding sites, but are not able to the active the catalytic sites. Thus product (s) are not formed.

They form weak linkages with the enzymes. Their effect can be neutralized completely or partly by an increase in the concentration of the substrate competitive inhibitors are the type of reversible inhibitor.

ESSAY TYPE QUESTIONS

Q1. **Explain the mechanism of enzyme action in detail.** (SGD. GI, 2015)

Q2. **Write a detailed note on inhibitors and its different types.** (RWP. GI, 2015) (GRW. GI, 2016)

Q3. **Explain how enzymes work in enzyme to enzyme chain or association?** (SWL. GI, 2015)

Q4. **Describe the function of Enzymes present in Pancreatic Juice.** (MLN. GI, 2015) (GRW. GI, MLN. GI, 2016)

Q5. **Describe characteristics of enzymes.** (RWP. GI, 2014)

CHAPTER 04

The Cell

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. **When cross-section of centriole is observed it shows as it consists of:** (RWP. GI, 2014)
   (A) 9-microtubules (B) 3-microtubules (C) 11-microtubules (D) 6-microtubules
2. **The end product of glucose breakdown during glycolysis is:** (RWP. GI, 2016)
   (A) Acetic acid (B) Citric acid (C) Oxalic acid (D) Pyruvic acid
3. **Organelle found in both prokaryotic and Eukaryotic cells:** (SGD. GI, GII 2016)
   (A) Ribosomes (B) Mitochondria (C) Chloroplasts (D) Lysosomes
4. **Organelle of symbiotic origin is:** (DGK. GII, 2016) (LHR. GII, 2017) (FBD. GI, RWP. 2015)
   (A) Cell wall (B) Cell membrane (C) Mitochondria (D) Vacuole
5. **The cells which transmit impulses are:** (DGK. GI, 2016)
   (A) Nerve cells (B) blood cells (C) kidney cells (D) bone cells
6. **The attachment of two sub units of ribosomes is controlled by:** (GRW. GII, 2017) (FBD. GII, 2019)
   (A) Ca^{2+} (B) Mg^{2+} (C) K^{+} (D) Fe^{2+}
7. **Ribosomes are particles of:** (SGD. GI, 2015)
   (A) Riboglyco-protein (B) Riboglyco-lipid
   (C) Ribonucleo-protein (D) Ribonucleo-lipid
8. **Haeme portion of Haemoglobin contains an atom of:** (RWP. GII, 2016)
   (A) Megnesium (B) Iron (C) Phosphorous (D) Copper
9. **The cells which secrete their hormones are:** (SGD. GII, 2015)
   (A) Blood cells (B) Nerve cells (C) Gland cells (D) Bone cells
10. **Which of the one in the following is a prokaryote?** (SGD. GII, 2014)
    (A) Amoeba (B) Alga (C) Fungus (D) Blue green alga
11. **Which is found in primary wall?** (FBD. GI, 2014)
    (A) Silica (B) Pectin (C) Lignin (D) Cutin
12. **They impart colors other then green:** (FBD. GI, 2017)
    (A) Chloroplasts (B) Chromoplasts (C) Leucoplasts (D) None
13. **In eukaryotic cell, Ribosomes are assembled in:** (SGD. GI, 2017)
    (A) Nucleus (B) Cytoplasm (C) Endoplasmic reticulum (D) Nucleolus
14. **All are related to secondary cell wall, except:** (FBD. GI, 2014)
    (A) Cutin (B) Silica (C) Waxes (D) Cellulose
15. **Which statement about plastid is true?** (MLN. GI, 2015)
    (A) They are surrounded by single membrane (B) They are power house of the cell
    (C) They are found in all organisms (D) They contain DNA and Ribosomes
16. **In many animal cells, the cell membrane helps to take in material by infolding in the form of vacuoles is called:** (MLN. GI, 2014)
    (A) Endocytosis (B) Exocytosis (C) Osmosis (D) Cyclosis
17. **The soluble part of cytoplasm is called:** (RWP. GII, 2017) (GRW. 2018)
    (A) Cisternae (B) Gel (C) Polysome (D) Cytosol
18. **Plastids are present only in:** (RWP. GI, 2016) (RWP. GII, 2017)
    (A) Bacteria (B) Animal Cell (C) Virus (D) Plant Cell

19. **The number of chromosomes in sperm of Drosophila is:** (RWP. GII, 2014)
(A) 8 **(B)** 4 (C) 6 (D) 23

20. **Organelle ——— is concerned with cell secretion.** (MLN. GI, 2014)
(A) Ribosomes (B) Mitochondria (C) Centriole **(D)** Golgi complex

21. **Cell walls of Prokaryotic Organisms lack cellulose, instead of cellulose its strengthening material is:** (GRW. GII, RWP. GI, 2014)
(A) Silica (B) Wax (C) Cutin **(D)** Murein

22. **Any foreign object that Gains Entry inside the cell is immediately engulfed by:** (DGK. GII, 2014)
(A) Lysosome (B) Ribosome (C) Peroxisome (D) Glyoxisome

23. **Membrane bounded green pigment containing bodies present in the cells are called as:** (DGK. GI, 2014)
(A) Plastids **(B)** Chloroplasts (C) Chromoplsts (D) Leucoplasts

24. **The fluid which surrounds the thylakoids is called:** (SWL. GI, 2016) (MLN. GI, 2017) (MLN. GI, 2019)
(A) Matrix **(B)** Stroma (C) Cytoplasm (D) Nucleoplasm

25. **Centriole is associated with:** (DGK. GII, 2014)
(A) DNA synthesis **(B)** Spindle formation (C) Respiration (D) Reproduction

26. **The plasma membrane and everything present within it is called:** (LHR. GII, 2016)
(A) Chloroplast **(B)** Protoplast (C) Cytoplasm (D) Protoplasm

27. **The process of taking in liquid material by cell membrane is called:** (SWL. GI, 2017)
(A) Phagocytosis (B) Exocytosis **(C)** Pinocytosis (D) Lymphocytosis

28. **The percentage of lipids in plasma membrane is:** (LHR. GI, 2017)
(A) 60-80 % (B) 30 – 60 % **(C)** 20-40 % (D) 10-20%

29. **Cell wall is secreted by:** (GRW. GI, 2018) (GRW. GII, 2015) (AJK. 2015)
(A) Protoplasm (B) Nucleoplasm (C) Golgi complex (D) ribosome

30. **Chitin is found in cell wall of:** (RWP. GI, DGK. GI, 2017)
(A) Algae (B) Bacteria **(C)** Fungi (D) Plants

31. **A structure found attached to membranes in cell. It consists of 2 parts. Name it.** (DGK. GII, 2015)
(A) Golgi Apparatus (B) Mitochondria (C) Lysosome **(D)** Ribosome

32. **What is not true about microfilaments?** (GRW. GI, 2015)
(A) Actin (B) Amoeboid movement
(C) Cyclosis **(D)** Linked with outer surface of plasma membrane

33. **The protein present in microtubules is:** (MLN. GI, 2017) (RWP. 2018)
(A) Actin (B) Tetroses **(C)** Tubulin (D) Tropomyosin

34. **The mitochondria functions in:** (LHR. GI, 2014)
(A) Lipid Storage (B) Protein synthesis (C) Photosynthesis **(D)** Cellular respiration

35. **Cristae are found in:** (RWP. GI, 2015)
(A) Golgi complex (B) Chloroplast (C) Endoplasmic reticulum **(D)** Mitochondria

36. **Stroma is a fluid in the chloroplast:** (MLN. GI, 2015)
(A) Thylakoids (B) Matrix (C) Granum (D) Intergranum

37. **The size of prokaryotic ribosome is:** (SGD. GII, 2015)
(A) 30S (B) 50S **(C)** 70S (D) 80S

38. **Infoldings of inner membrane of mitochondria are:** (FBD. GI, 2017)
(A) Granum (B) Thylakoids (C) Cisternae **(D)** Cristae

39. **Proteins are synthesized by** (SWL. 2018)
(A) polysome (B) nucleosome (C) lysosome **(D)** ribosome

40. **Cell membrane has 60 - 80%:** (LHR. GI, 201[illegible])
(A) Lipids **(B) Proteins** (C) Carbohydrates (D) Vitamins

41. **The enzymes which are involved in protein synthesis are integral part of:** (SGD, 201[illegible])
(A) Chromosomes (B) Peroxisomes (C) Lysosomes **(D) Ribosomes**

42. **Harmful substances are detoxified in the liver cells by:** (SGD, 201[illegible])
(A) Mitochondria **(B) Endoplasmic reticulums**
(C) Golgi complex (D) Nucleolus

43. **Sedimentation rate of Eukaryotic Ribosome is:** (BWP, 201[illegible])
(A) 30 S (B) 50 S (C) 70 S **(D) 80 S**

SHORT ANSWER QUESTIONS

1. **When nucleus of the cell is visible?** (DGK, GI, 201[illegible])

Ans. Nucleus is only visible when the cell is in non-dividing stage.

2. **What is the function of xylem and phloem?** (GRW, GI, 201[illegible])

Ans. Xylem cells conduct water and mineral salts from soil to the aerial parts of the plant while phloem cells transport food.

3. **What is plasma membrane? Give its composition.** (BWP, GI, 2015) (DGK, GI, 201[illegible])

Ans. **Plasma Membrane:** Plasma membrane or cell membrane is the outer most boundary of the cell. However, in most plant cells, it is covered by a cell wall.

Composition: Plasma membrane is chemically composed of lipids and proteins; 60-80% are proteins, while 20-40% are lipids. In addition there is a small quantity of carbohydrates.

4. **Compare nucleus with nucleoid.** (LHR, GI, 201[illegible])

Ans. Nucleus is a well defined structure present in eukaryotic cell containing genetic material and is covered by, while nucleoid is the region in bacterial or prokaryotic cell where nuclear material of bacterial cell is present.

5. **Describe two regions of nucleolus.** (SWL, GI, 20[illegible])

Ans. Nucleolus is composed of two regions.
The peripheral granular area composed of precursors of ribosomal sub units and central fibrillar region consisting of a large molecular weight RNA and rDNA.

6. **Define fluid mosaic model of the cell membrane.**
(LHR, GI, 2014) (GRW, GI, 2016) (LHR, GII, DGK, GI, 2017)

Ans. **Fluid Mosaic Model:** "According to fluid mosaic model, the membrane structure includes a lipid bilayer with several types of proteins embedded and protruding". At normal biological temperatures, the plasma membrane acts like a thin layer of fluid across which proteins move freely, like icebergs in a lipid sea. Cell membrane contains charged pores through which movement of materials take place, both by active and passive transport.

7. **Define semi-permeable membrane.** (BWP, GII, 201[illegible])

Ans. The membranes which allows passing only selective substances to pass through is called selectively or semi-permeable membrance e.g., plasma membrane.

8. **Define endocytosis.** (SGD, GI, 201[illegible])

Ans. **Endocytosis:** Endocytosis is the intake of materials with the help of cell membrane by infolding in the form of vacuoles in many animal cells.
Endocytosis can be of further two types as under:
i. Phagocytosis (to engulf solid particles)
ii. Pinocytosis (to take in liquid material)

9. What are Thylakoid and Granum? (DGK.GII. 2015) (DGK. GII. 2016)

Ans.

Thylakoid	Granum
i. Thylakoid are the flattend vesicles which arrange themselves to form grana and intergrana.	i. A granum appears to be a pile of thylakoids stacked on each other like coins.
ii. On the layers of thylakoids, chlorophyll molecules are arranged and that is why granum appears to be green.	ii. Each granum is interconnected with other by the non proteins part called intergranum. Members of the grana are sites where sunlight energy is trapped and where ATP is formed.

10. Why is mitochondrion called self replicating organelle? (DGK. GI, SWL. GI. 2016)

Ans. It is called self replicating organelle because metochondria can increase number without involving the cell division when ever cell needs more mitochondria.

11. Cell membrane is selectively permeable membrane. Justify it. (MLN. GI. 2016)

Ans. Selectively Permeable Cell Membrane:

i. Cell membrane offers a barrier between the cell contents and their environment, allowing only selective substances to pass through it.

ii. The substances which are lipid soluble cross it more easily than others, therefore it regulates the flow of materials and ions to maintain a definite gradients.

iii. Many small gas molecules, water, glucose etc. being neutral can easily cross while ions, being charged particles, have some difficulty in crossing.

12. Compare composition of primary and secondary cell walls.
(GRW. GI. 2014) (FBD. GI. 2015) (LHR. GI. GRW. GI. 2017)

Ans.

Primary Cell Wall	Secondary Cell Wall
i. The primary cell wall is a true wall and develops in newly growing plant cells around cell membrane.	i. The secondary cell wall is formed on inner surface of primary cell wall and is comparatively thick and rigid.
ii. Primary cell wall is chemically composed of cellulose and some deposition of pectin and hemicellulose.	ii. Secondary cell wall is chemically composed of inorganic salts, silica, waxes, cutin, lignin etc.

13. How outer and inner membranes of mitochondria differ from each other? (FBD. GI. 2017)

Ans.

Outer membrane of mitochondria	Inner membrane of mitochondria
Outer membrane is smooth. No crista is formed by it. It lacks F1 particles. Outer membrane consists mostly of phospholipids, considerable amount of choles[illegible]l and some amount of protein. Protein[illegible]nzymes) in the outer membrane carry out various reactions in the fatty acid metabolism and phospholipids biosynthesis and are responsible for some oxidation reactions.	Inner membrane is highly folded. The tightly packed inward folds of inner membrane are called cristae. Knob like F1 particles are embedded in the fold of inner membrane. Inner membrane is very rich in proteins and has less amount of lipid. Most of oxidative reactions occur on inner membrane.

14. Where are the new Ribosomes assembled? (DGK. GI. 2016)

Ans. i. New ribosomes are assembled in the nucleolus of nucleus and are then exported to the cytoplasm via nuclear pores.

ii. Nucleolus of nucleus is the ribosome synthesizing factory where as ribosome is protein synthesizing factory in the cell.

15. How cell wall of plants differ from prokaryotes? (MLN. GII. 2017)

Ans. The outermost boundary in most of the plant cells is cell wall. The cell wall of plants is different from the prokaryotes in structure and chemical composition. It is secreted by the protoplasm of the cell. The thickness of cell wall is different in different types of cells. Cell wall is composed of three main layers: primary wall, secondary wall and middle lamella.

Cell wall of Prokaryotes: Prokaryotes cell wall lacks cellulose. Their wall is composed of peptidoglycan or murein.

16. Give structure and composition of bacterial cell wall. (MLN. GII. 2017)

Ans. Structure of Cell Wall: Cell wall is present beneath the extra cellular substances. It is external to the cytoplasmic membranes. It is rigid structure. It determines the shape of the bacteria. Cell wall also protects the cells from the osmotic lysis.

Composition of Cell Wall:

i. The cell wall of most bacteria have a unique macromolecule called peptidoglycan. Its amount is different in different types of bacteria. It is composed of long framework of glycan (glucose) chains. Glycan chains are linked with peptide fragments.

ii. The intact cell wall also contains some molecules of sugar, techoic acid, lipoproteins and Lipopolysaccharides. These molecules are linked to peptidoglycan.

iii. The cell wall structure present in gram-positive and gram-negative bacteria is absent in some bacteria. Some bacteria have no cell wall at all. The cell wall of Archaeobacteria is different from the Eubacteria. Archeeobacteria do not contain peptidoglycan. Their cell wall is composed of proteins, glycoprotein and polysaccharides.

17. What is meant by cell fractionation? (AJK. GI. 2015) (BWP. 2019)

Ans. Cell fractionation: Cell fractionation is a technique used to isolate various cellular components including its organelles to determine their chemical composition.

18. Give Important Functions of Cytoplasm. (LHR. GI. 2015) (AJK. GI. 2016) (SGD. 2019)

Ans. Functions of Cytoplasm:

i. The most important function of the cytoplasm is to act as a store house of vital chemicals.

ii. It is also a site for certain metabolic process such as glycolysis.

iii. A variety of cell organelles and other inclusions such as insoluble waste and storage products are present in cytoplasm.

19. What is differentially permeable membrane? (RWP. 2019)

Ans. Differentially (selectively) Permeable Membrane means that certain substances can move across the membrane while others can not. The plasma membrane is differentially permeable. Certain substances can freely pass through the membrane, and others can not. Moreover in response to varying environmental conditions or cell needs, a membrane may be a barrier to a particular substance at one time and actively promote the passage at another time.

20. How many types of endoplasmic reticulum are present? (RWP. GI, 2015) (GRW. GI, 2016)

Ans. Types of Endoplasmic Reticulum: There are two types of endoplasmic Reticulum as under:

i. Rough Endoplasmic reticulum (RER) ii. Smooth Endoplasmic Reticulum (SER)

i. Rough Endoplasmic Reticulum: Rough endoplasmic Reticulum is marked by the presence of ribosomes attached to the membranes of endoplasmic reticulum. That's why its outer surface is rough.

ii. Smooth Endoplasmic Reticulum: Smooth endoplasmic reticulum is characterised by the absence of ribosomes. That's why its outer surface is smooth.

21. How mitochondria are Power House of cell? (GRW. GII, 2015)

Ans. Mitochondria are Power House of cell because they produce most of the ATP used by the cell through cellular respiration.

22. Write down the role of centrioles. (GRW. GI, 2014) (GRW. GI & GII, 2015) (AJK. GI, 2017) (SGD. 2018)

Ans. Location of centrioles: Centrioles are located in animal cell near the exterior surface of the nucleus. The centrioles are usually placed at right angle to each other.

Role of centrioles:

i. Centrioles play important role in the location of furrowing during cell division.

ii. Centrioles are duplicated before cell division and may play a role in some types of microtubule assembly.

iii. Centrioles plays a role in the formation of cilia.

iv. They give rise to the basal bodies of cilia and flagella.

Centrioles are located in animal cell near the exterior surface of the nucleus. The centrioles are usually placed at right angle to each other.

23. How cristae is different from cisternae? (GRW. GI, DGK. GI & GII, 2015) (GRW. GI, 2016) (SWL. GI, 2017)

Ans.

Cisternae	Cristae
i. Cisternae are structural and functional units of endoplasmic reticulum and Golgi Apperatus.	i. Cristae are structural and functional units of mitochondria.
ii. In Endoplasmic reticulum, cisternae are a network of channels extending throughout the cytoplasm.	ii. A cristae is made up of lipoprotein membrane containing different enzymes as well as F1 particles embedded in it.
iii. In Golgi Apparatus, cisternae are stacks of flattened, membrane bound sacs associated with vesicles.	iii. Cristae are formed in mitochondria by infolding of inner membrane into the inner chamber i.e., mitochondrial matrix.

24. What are two subunits in ribosomes and how their attachment is controlled? (MLN. GI, 2015) (RWP. GII, 2017)

Ans. Subunits in Ribosomes: Each eukaryotic ribosome consists of two sub units as under:

i. Large subunit ii. Smaller subunits

The larger subunit sediments at 60S, while smaller subunit sediments at 40S. Two subunits on attachments with each other form 80S particle. This attachment is controlled by the presence of Mg^{2+} Ions.

25. Write down the two functions of Golgi complex. (LHR. GII, 2017)

Ans. Functions of Golgi complex: Golgi complex performs following functions:

i. Cell Secretions: Golgi complex is concentrated with cell secretions. There are following step in the process of cell secretions.

☆ The ribosomes synthesis protein part of the cell secretions.

☆ The endoplasmic reticulum transfers it to Golgi apparatus.
☆ Golgi apparatus converts the secretion to finished products. These secretions are packed inside the membrane to form granules.
☆ Finally granules are exported outside by cell membrane.

ii. **Transportation:** Golgi apparatus transport the proteins or enzymes outside the cell.

26. Define polysome and ribosomes. (SGD. GI, LHR. GI. 2015) (RWP. GI. 2016) (MLN. GI. 2017)

Ans. Polysome: A group of ribosomes attached to mRNA is known as polysome.

Ribosomes: The factory of protein synthesis in the cells is the ribosomes.

Each ribosome consists of two parts:

i. Ribosomal RNA (rRNA) ii. Two protein subunits

27. Give the functions of lysosomes in eukaryotic cells: (LHR. GI, 2016)

Ans. Funtions of Lysosomes: Some of the important functions of lysosomes in eukaryotic cells are as under:

i. Lysosomes protect the cells from invading organisms or any other foreign object, which are engulfed in the cells as phagocytic vacuoles.
ii. Sometime, under abnormal circumstances, e.g., starvation, or as a normal physiological process the parts of the cell are engulfed by primary lysosomes and digested to generate energy.
iii. Lysosomes release enzymes for extracellular digestion.
iv. Lysosomes are involved in the autophagy. During this process some old, worn out parts of cell, such as old mitochondria are digested.

28. How Microtubules differ from Microfilament?
(SGD. GI, 2015) (RWP. GI, 2016) (LHR. GI, 2017) (GRW, FBD, RWP, 2018) (RWP, 2019)

Ans.

Microtubules	Microfilament
i. They are thickest filaments of the cytoskeleton.	i. They are thinnest filaments of the cytoskeleton.
ii. They are small, hollow cylinders about 25nm in diameter and from0.2-25 μm in length.	ii. They are long, extremely thin, flexible, solid fibers about 1 μm in diameter.
iii. They have a role in assembly and disassembly of spindle structure during mitosis.	iii. They are involved in internal cell motion.
iv. They are made up of tubulin protein.	iv. They are made of actin protein.

29. Give role and composition of cytoskeleton. (GRW. GI, 2017)

Ans. Cytoskeleton: Cytosol contains cytoskeleton fibers. It is formed of microtubules, microfilaments and intermediate filaments.

Chemical Composition of Cytoskeleton: The main proteins in cytoskeleton are tubulin (in microtubules), actin, myosin, tropomysin, and other proteins found in muscles.

Role of Cytoskeleton:

i. Several cell organelles are derived from microtubules. These organelles are cilia, flagella, basal bodies and centrioles.
ii. The cyclosis (movement of cytoplasm) and amoeboid movements take place by microfilaments.
iii. Intermediate filaments are involved in determination of cell shape. They also play role in integration of cellular components.

30. What are intermediate filaments? (LHR. GI, 2017)

Ans. Intermediate Filaments: They have diameter in between microtubules and microfilaments. They perform the following functions:

i. They play a role in the determination and maintenance of cell shape.

ii. They are involved in the integration of cell compartments.

31. Differentiate between chromoplasts and leucoplasts. (MLN. GI, 2014) (LHR. GI, DGK. GI, 2015) (BWP. GII, FBD. GI, 2017) (FBD. 2018) (FBD. GII, MLN. GI, SWL. 2019)

Ans.

Chromoplasts	Leucoplasts
i. Chromoplasts impart colours to the plants other than green.	i. Leucoplasts are colour less.
ii. Chromoplasts are present in the petals of the flower and in the ripened fruit.	ii. Leucoplasts are found in the underground parts of the plant and store food.
iii. Chromoplasts help in pollination and dispersal of seeds.	iii. Leucoplasts are triangular, tubular or of some other shape.

32. What are plastids? Give functions of one of them. (SWL. GI, 2014) (SGD. GI & GII, 2016)

Ans. Plastids: Pigment containing membrane bounded organelles, present in plant cells only, are called plastids. There are three main types of plastids as under:

i. Chloroplasts ii. Chromoplasts iii. Leucoplasts

Chloroplasts:

Chloroplasts are membrane bound structures containing green pigment chlorophyll found in photosynthetic plant cells. Photosynthesis takes place in chloroplasts.

33. What is Stroma? Give its Function. (MLN. GI, 2014) (FBD. GI, 2016) (GRW. GII, BWP. GII, 2017)

Ans. Stroma: Stroma is a fluid which surrounds the thylakoids in chloroplasts. It contains proteins, some ribosomes and a small circular DNA. Stroma covers most of the volume of the chloroplast.

Functions: Some important functions of stroma in chloroplast are as under:

i. CO_2 is fixed in photosynthesis to manufacture sugars in stroma of the chloroplasts.

ii. Some proteins are also synthesized in stroma of chloroplast due to presence of ribosomes in it.

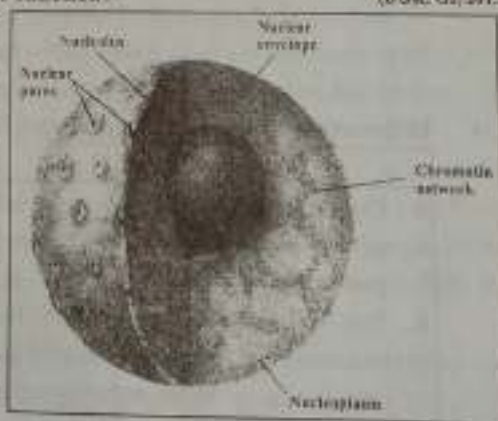
iii. Dark reaction of photosynthesis takes place in stroma of chloroplasts.

34. What are nuclear pores? What is their function? (DGK. GI, 2015)

Ans. Nuclear Pores: Nuclear envelope is composed of two membranes, i.e., outer and inner. Nuclear pores are formed as a result when the outer and the inner membranes are continuous at certain points.

Function:

i. The nuclear pores allow the exchange of materials between the nucleus and the cytoplasm.

ii. Each pore has a definite structure which controls the traffic of substances passing through them.

35. Give functions of smooth endoplasmic reticulum. (GRW. GI, 2014) (MLN. GI, 2015) (BWP. GI, 2017) (LHR. GI, MLN. GII, SWL. 2019)

Ans. Functions of Smooth Endoplasmic Reticulum:

i. **Transportation of Materials:** Smooth reticulum plays an important role in the transport of materials from one part of the cell to the other.

ii. **Detoxification of Harmful substances:**
Smooth endoplasmic reticulum due to its own enzyme system metabolizes or destroys the toxic substances like steroids, carcinogens, toxin etc.

iii. **Synthesis of Lipids:** The smooth endoplasmic reticulum synthesizes different types of lipids which are used for the formation of plasma membrane and steroid hormones like testosterone and estrogens. Glycogen and glycolipids are also synthesized here.

iv. **Transmission of Nerve Impulse:**
The smooth endoplasmic reticulum of the muscle cell is well developed and is involved in the transmission of nerve impulse which initiates muscle contraction.

36. What is nucleolus? Give its function. (LHR. GI. AJK. 2018)

Ans. Nucleolus: Nucleolus is a darkly stained body within the nucleus. There is no membranous boundary to separate it from the rest of the nuclear material. There may be one or more nucleoli in the nucleus.

Function of Nucleolus: The ribosomal RNA (rRNA) is synthesized and stored in the nucleolus. It is composed of two regions, the peripheral gradual area composed of precursors of ribosomal subunits and the central fibril consisting of large molecular weight RNA and rDNA. Ribosome are assembled in nucleolus and are then exposed to the cytoplasm via nuclear pores.

37. What are Golgi apparatus? Give its functions. (GRW. 2018)

Ans. Golgi Apparatus: Golgi apparatus is a complex system of interconnected tubules around the central stocks.

Functions:

i. The main function of the golgi apparatus or golgi complex is cell secretion.
ii. The exportable proteins or enzymes synthesized by the ribosomes are passed to endoplasmic reticulum and stored in the golgi apparatus.
iii. The carbohydrates, lipids and proteins synthesized by the endoplasmic reticulum are modified as glycoprotein within golgi complex.
iv. In mammals, the golgi bodies have a role in the formation of certain granules secreted by pancreas. These granules have enzymes that help in digestion.

38. Differentiate between Prokaryotic and Eukaryotic. (RWP. GI. DGK. GII. 2017) (MLN. GI. 2018)

Ans.

Prokaryotic	Eukaryotes
i. Organisms possessing prokaryotic cells are called prokaryotes e.g., bacteria and blue green algae.	i. Organisms possessing eukaryotic cells are called eukaryotes e.g., plants, animals, fungi and protista.
ii. They lack many of the membrane bounded structures e.g., mitochondria, endoplasmic reticulum, golgi bodies and chloroplasts etc.	ii. They have membrane bound structures.
iii. Nuclear membrane is absent, therefore, prokaryotic cell has no distinct nucleus.	iii. A double nuclear membrane is present. They have a well defined nucleus.
iv. Prokaryotes have a small sized 70S ribosomes. Mitosis is missing and cell divides by fission.	iv. Eukaryotes have 80S ribosomes. Mitosis occurs.

39. **What is division of labour?** (SGD. 2019)

Ans. **Division of Labour:** Division of labour is a term that describes the specialised functions of cell organelles which come together to ensure the cell is capable of surviving as well as performing its role in the body.

Example: Beta cells in the pancreas are responsible for releasing insuline into the bloodstream.

40. **Differentiate between Granum and Thylakoid Membrane.** (BWP. 2019)

Ans.

Granum Membrane	Thylakoid Membrane
A granum appears to be a pile of thylakoids stacked on each other like coins. On an average, there are 50 or more thylakoids piled to form one granum. On the layers of thylakoids chlorophyll molecules are arranged and that is why granum appears to be green. Each granum is inter-connected with other by the non-green part called intergranum.	Thylakoids are the flattened vesicles which arrange themselves to form grana intergrana.

41. **What is Centromere and its role?** (BWP. 2018)

Ans. **Centromere:** Centromere is the place on the chromosome where spindle fibres are attached during cell division.

Role of Centromere: Centromere plays an essential role in the equal chromosomes segregation by directing the assembly of the microtubule binding kinetochore and serving as the cohension site between sister chromatids.

42. **What is secondary cell wall? Give its composition.** (AJK. 2018)

Ans. **Secondary Cell wall:** The secondary cell well is formed on inner surface of primary wall and is comparatively thick and rigid.

Composition: Chemically it is composed of inorganic salts, silica, waxes, cutin, lignin etc. Prokaryotic cell wall lacks cellulose; its strengthening material is peptidoglycan or murein. Fungal well contains chitin.

43. **How intermediate filaments support cell?** (LHR. GI. 2019)

Ans. Intermediate filaments involve in determination of cell shape. Its also play an important role in the maintenance of cell shape and integration of cellular compartment of cells.

44. **Give role of vacuole in plant cell.** (LHR. GI. 2019)

Ans. Plant vacuole due to their turgidity provides support to individual plant cell and contributes to the rigidity of the leaves and younger parts of the plants. Vacuoles serve to expand the plant cell without diluting its cytoplasm and also act as a store house for many solutes and macromolecules such as proteins, ions, sugars.

45. **Write four important functions of endoplasmic reticulum.** (FBD. GI. 2019)

Ans. **Four important functions of endoplasmic reticulum:**

i. Rough endoplasmic reticulum is involved in the synthesis of protein.
ii. Smoth endoplasmic reticulum is involved in the metabolism of lipids.
iii. Due to flexible nature of plasma membrane and ability to extend into cytoplasm provide mechanical support to the cell.
iv. Smoth ER produce many hormones such as testosterone and estrogen.

(MLN. GII. 2019)

46. **What are microtubules? Write their function.**

Ans. **Microtubules:** Microtubules are long unbranched, slender tubulin protein structure. One very important junction of microtubules is their role in the assembly and disassembly of the spindle structure during mitosis

(SWL. 2019)

47. **Give role of mitochondria in the cell.**

Ans. **Role of Mitochondria:** Power house of cell because they provide energy (ATP) to cell Mitochondria convert food material into energy rich compound ATP which supply energy to cell on demand.

☆ Krebs cycle, aerobic respiration, fatty acid metabolism takes place in mitochondria.

☆ Presence of DNA and ribosome indicates that some proteins are synthesized in them.

(DGK. 2019)

48. **What are chromoplasts?**

Ans. **Chromoplasts:** They import colours to the plants other than green. They are present in the petals of the flower and in the ripened fruit. They help in pollination and dispersal of seeds.

ESSAY TYPE QUESTIONS

Q1. Define Fluid Mosaic Model and functions of plasma membrane.

(RWP. GI, BWP. GI. 2016) (MLN. GII. 2019)

Q2. Describe the structure and function of plasma membrane.

(SWL. GI, AJK. GI, 2016) (DGK. GI. 2017) (SWL., BWP, AJK. 2019)

Q3. Write a detailed note on Endoplasmic Reticulum.

(FBD. GI. 2014) (LHR. GII. DGK. GII. 2015) (SGD. GI. 2016) (FBD. GII. 2019)

Q4. Write a note on Ribosomes. (LHR. GI. 2015)

Q5. Describe structure and function of Golgi Apparatus in a Cell.

(MLN. GI. 2015) (MLN. GI. 2016)

Q6. Show the similarities and differences in structure and functions of Mitochondria and Chloroplasts. (DGK. GI. 2015)

Q7. Write a note on Mitochondria.

(SGD. GII, FBD. GI. 2015) (LHR. GI, MLN. GI. 2016) (GRW. GI, RWP. GII. BWP. GI. 2017) (MLN. GI, BWP. 2018) (LHR. GI, FBD. GI. 2019)

Q8. Described the structure and functions of Chloroplast.

(SWL. GI. 2014) (GRW. GI. 2015) (LHR. GII, SGD. GII. 2016) (SGD. 2019)

Q9. What are plastids? Explain structure and function of Chloroplast.

(GRW. GI. MLN. GI. 2014) (GRW. GII. RWP. GI. 2015) (GRW. GI, FBD. GI, DGK. GII. 2016) (LHR. GII, GRW, RWP. 2019)

Q10. Differentiate between Prokaryotic and Eukaryotic cells.

(SGD. GI. 2014) (AJK. GI. 2015) (DGK. GI. 2016) (FBD. GI, MLN. GI. 2017) (DGK. 2019)

Q11. Write a note on Golgi Apparatus. (FBD. 2019)

Q12. Define Cell Cytoplasm. Explain its functions. (MLN. GII. 2018)

Q13. Discuss chloroplast in plants. (DGK. GI. 2018)

Q14. Give structure and function of nucleus. (SGD. 2019)

****

Variety of Life

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. **Closely related classes are grouped into:** (SGD. GI, 2015)
   (A) Division (B) Order (C) Family (D) Kingdom
2. **Initially, the classification was based on:** (GRW. GI, 2015)
   (A) Cytology (B) Physiology **(C)** Morphology (D) Genetic features
3. **Family includes related:** (LHR. GI, 2015)
   (A) Species **(B)** Genera (C) Families (D) Orders
4. **The biological name of sweet pea is:** (RWP. GI, 2015)
   (A) Arachis hypogea (B) Solanum nigrum
   (C) Lathyrus odoratus (D) Lycopersicum esculentum
5. **Small pox is caused by Pox Virus which is:** (SWL. GI, 2016) (LHR. GII, 2017)
   (A) DNA Naked Virus (B) RNA Naked Virus
   (C) DNA Enveloped Virus (D) Complex Virus
6. **Kingdom Protoctista was proposed by:** (FBD. GII, 2015)
   (A) Herbert Copland **(B)** John Hogg
   (C) Robbert Whittaker (D) Margulis and Schwartz
7. **Independent evolutionary unit is:** (LHR. GI, 2016)
   (A) Species (B) Population (C) Genus (D) Family
8. **Which of the following is not caused by virus?** (LHR. GI, 2014)
   (A) Cholera (B) Hepatitis (C) Influenza (D) Polio
9. **The major cell infected by HIV is the helper:** (LHR. GI, 2017)
   (A) A-Monocyte (B) T-Monocyte (C) B-Lymphocyte **(D)** T-Lymphocyte
10. **The scientific name of onion (piyaz) is:** (LHR. GII, 2015)
    (A) Allium cepa (B) Cassia fistula (C) Homo sapiens (D) Solanum tuberosum
11. **The Common name for Solarium melangena is:** (RWP. GI, 2015)
    (A) Onion **(B)** Brinjal (C) Potato (D) Amaltas
12. **The smallest known viruses are of:** (LHR. GI, 2016) (RWP. GI, 2017)
    (A) Bacteriophage (B) Small pox **(C)** Polio (D) Mumps
13. **Which type of hepatitis leads to chronic liver disease?** (LHR. GII, 2016)
    (A) Hepatitis A (B) Hepatitis B **(C)** Hepatitis C (D) Hepatitis D
14. **The basic unit of classification is:** (LHR. GI, 2016) (FBD. GI, 2017)
    (A) Genus (B) Phylum (C) Class **(D)** Species
15. **Foot and mouth disease is caused by:** (LHR. GII, 2014)
    (A) Algae (B) Bacteria (C) Fungi **(D)** Virus
16. **Towart in 1915 and D Herelle in 1917 discovered:** (LHR. GI, 2014)
    (A) Pox virus (B) Adenovirus **(C)** Bacteriophages (D) Herpes virus
17. **AIDS is caused by:** (GRW. GI, 2014) (LHR. GI, 2019)
    (A) Fungi (B) Bacteria **(C)** Virus (D) Lichen

18. **Small pox is caused by:** (GRW. GII, 2015)
(A) Virus (B) Bacteria (C) Fungi (D) Protozoa

19. **The branch of Biology which deals with the study of virus is called:** (GRW. GII, 2016)
(A) Biology (B) Cytology **(C)** Virology (D) Taxonomy

20. **Solanum esculentum is the scientific name of:** (MLN. GI, 2016) (MLN. GII, 2017)
(A) Potato (B) Tobacco (C) Onion **(D)** Tomato

21. **The smallest known viruses contain RNA in spherical capsid are the:** (MLN. GI, 2017)
(A) Polio Viruses **(B)** Pox Viruses (C) Herpes Viruses (D) Influenza Viruses

22. **The genus for corn plant is:** (SWL. GI, 2014) (FBD. GII, 2015)
(A) Pisum (B) Solanum (C) Mays **(D)** Zea

23. **Euglena is included in Kingdom:** (SGD. GII, 2014)
(A) Monera **(B)** Protista (C) Fungi (D) Plantae

24. **In 1866, Hackel proposed third kingdom known as:** (RWP. GI, 2017)
(A) Monera (B) Plantae (C) Fungi **(D)** Protista

25. **Herpes virus is responsible for Herpes:** (RWP. GI, 2015)
(A) Simplex (B) Duplex (C) Triplex (D) Quadruplex

26. **To accommodate euglena like organisms and bacteria, kingdom protista was proposed by:** (GRW. GI, 2014)
(A) Ernst Hackel (B) Linnaeus (C) Robert Whittaker (D) E-Chatton

27. **Measles and mumps are caused by a virus belonging to a group called as:** (SWL. GII, SGD. GI, 2014) (SGD. GI, 2015)
(A) Pox virus **(B)** Paramyxo virus (C) Polio virus (D) Adeno virus

28. **A group of population which can interbreed freely and produces fertile offspring is called:** (FBD. GI, 2017)
(A) Population (B) Genera **(C)** Species (D) Order

29. **Capsid is made up of protein sub-units known as:** (SGD. GII, 2014)
(A) Capsidomeres (B) Capsomeres **(C)** Capomeres (D) Protomeres

30. **The virion is surrounded by a protein coat called:** (FBD. GI, 2017)
(A) Capsomere (B) Centromere **(C)** Capsid (D) None of these

31. **Botanical name for potato is:** (FBD. GII, 2017)
(A) Solanum melongena (B) Cassia fistula
(C) Solanum tuberosum (D) Zea mays

32. **Eukaryotic multicellular autotrophs are included in kingdom:** (FBD. GII, 2015)
(A) Animalia (B) Monera (C) Protista **(D)** Plantae

33. **Infectious Hepatitis is caused by:** (FBD. GI, 2014)
(A) Hepatitis A virus (B) Hepatitis B virus (C) Hepatitis C virus (D) Hepatitis D virus

34. **The first step in the replication of bacteriophage is:** (FBD. GII, 2016)
(A) Penetration **(B)** Adsorption (C) Injection (D) None

35. **In five kingdom classification developed by Whittaker, member of the Kingdom Plantae are autotrophic, eukaryote and:** (MLN. GI, 2017)
(A) Multicellular (B) Motile
(C) Having sexual reproduction (D) None of these

36. **The infectious proteins are:** (MLN. GI, 2014) (MLN. GII, 2015) (RWP. 2018)
(A) Viruses (B) Viroids (C) Virions **(D)** Prions

37. **About 60% of adults are immune to disease:** (SWL. GI, 2014) (SWL. GI, 2015)
(A) Mumps (B) Measles (C) Influenza (D) Polio

38. **A virion is a:** (MLN. GI, 2017)
(A) Virus (B) Viral protein (C) Viral lysozome (D) Viral gene

39. **Infectious Hepatitis is caused by:** (FBD. GI, 2014)
(A) HAV (B) HBV (C) HCV (D) HDV

40. **The botanical name of corn is:** (MLN. GI, 2015)
(A) Avena sativa (B) Triticum aestivum (C) Zea mays (D) Solanum tuberosum

41. **Hepatitis D is also called:** (MLN. GII, 2019)
(A) Serum Hepatitis (B) Infectious Hepatitis
(C) Delta Hepatitis (D) Bacterial Hepatitis

42. **Which one of the following is not viral disease?** (RWP. GI, 2017) (LHR. GI, 2018)
(A) Cow pox (B) Mumps (C) Tetanus (D) Small pox

43. **A disease, which is highly contagious is:** (FBD. GII, 2017)
(A) Measles (B) Mumps (C) Influenza (D) Herpes

44. **Hepatitis "B" is also called:** (GRW. GI, 2017)
(A) Delta Hepatitis (B) Infectious Hepatitis (C) Infusion Hepatitis (D) Serum Hepatitis

45. **Genetically engineered vaccine is not available for:** (DGK. GII, 2014)
(A) HAV (B) HBV (C) HCV (D) HDV

46. **Hepatitis is an inflamation of:** (DGK. GI, 2017)
(A) Stomach (B) Pancreas (C) Liver (D) Kidney

47. **The process in which the phage is called a prophage is termed as:** (RWP. GI, 2016)
(A) Induction (B) lysogeny (C) Deduction (D) Penetration

48. **Temperate phages exists as:** (SGD. GI, 2016) (AJK, 2019)
(A) Prophage (B) Lambda phage (C) Retrovirus (D) Viroid

49. **HIV infects and multiplies in:** (BWP. GII, 2014)
(A) Cat (B) Monkey (C) Dog (D) Pigs

50. **Five kingdom systems classification was proposed by:** (DGK. GI, 2015)
(A) E.Chatton (B) Ernst Haeckel (C) Linnaeus (D) Robert Whittaker

51. **Paramyxo viruses cause the disease:** (LHR. GI, 2014) (AJK. GI, 2016)
(A) Influenza (B) Polio (C) Mumps and Measles (D) Herpes Simple

52. **Influenza viruses are:-** (MLN. GI, 2018) (MLN. GII, 2019)
(A) Enveloped RNA viruses (B) Non enveloped RNA viruses
(C) DNA enveloped viruses (D) DNA naked viruses

53. **Binomial system of Nomenclature was derived by:**
(BWP. GI, 2014) (SGD. GI, 2015) (LHR. GI, 2017) (AJK, 2018)
(A) Robert Whittaker (B) Ernst Hackel
(C) E Chatton (D) Carlous Linnaeus

54. **Pig could be the source of infection of hepatitis:** (LHR. GII, 2019)
(A) A (B) B (C) E (D) C

55. **About 25 minutes after initial infections approximate number of new bacteriophages formed is:** (GRW. 2019)
(A) 100 (B) 200 (C) 2000 (D) 500

(MTN. GI, 2019)

56. **Rapid phase of growth of Bacteria is:**
(A) Lag phase (B) Log phase (C) Stationary phase (D) Death/decline phase

(SWL. 2019)

57. **Hepatitis C is caused by virus:**
(A) DNA non enveloped (B) DNA enveloped
(C) RNA non enveloped (D) RNA enveloped

SHORT ANSWER QUESTIONS

(FBD. GII, 2015)

1. **Why paramyxoviruses famous for?**

Ans. Paramyxoviruses are famous for Measeless and Mumps viruses.

2. **Define species. Give one example.** (SWL. GI, BWP. GI, 2014) (LHR. GII, 2015) (SGD, DGK. GII, 2018)

Ans. **Species:** "A species is a group of natural population which can interbreed freely among themselves and produce fertile offsprings, but are reproductively isolased from all other such group in nature."

Example: Corn, man etc.

Virology: Virology is the branch of Biology which deals with the study of viruses.

3. **What are capsids made up of?** (LHR. GII, 2014)

Ans. Chemically capsids are made up of proteins and physically they are made up of capsomers or subunits that join together to form the capsid.

4. **Give biological classification of corn.**
(GRW. GI & GII, 2014) (DGK. GI, 2015) (BWP. GI, 2016) (DGK. GII, 2017) (AJK, LHR. GII, 2018) (GRW. 2019)

Ans. **Biological Classification of Corn:**

Kingdom	Plantae
Division (phylum)	Anthophyta (Tracheophyta)
Class	Angiospermae
Order	Poales
Family	Poaceae
Genus	Zea
Species	Mays

5. **What is binomial nomenclature? What are the rules of nomenclature?**
(GRW. GI, BWP. GI, 2015) (DGK. GII, 2016)
(LHR. GII, BWP. GI, 2017) (GRW, RWP, 2018) (BWP, 2019)

Ans. **Binomial Nomenclature:**

Binomial Nomenclature is the assignment of names to organisms using two Latin words, the first denoting the genus and the second descriptive name, the two, together constitute the name of species.

Rules of Binomial Nomenclature: Following are some rules of Binomial nomenclature:

i. The name of species are derived from Latin or Latinized Greek words.
ii. Scientific names are usually printed in italics. When handwritten they are underlined.
iii. The first generic name always begins with capital letter.
iv. The second specific name is written in small letters.

Examples:

Common Names	Scientific Names
Man	Homo sapiens
Onion	Allium cepa
Amaltas	Cassia fistula

6. **Write down four characteristics of viruses.** (LHR. GII, 2014)

Ans. Characteristic of Viruses:

i. Viruses are extremely small (10 to 1000 times smaller than bacteria) which can pass through porcelain filters.

ii. They are obligate intracellular parasites.

iii. They are composed of protein coat and genome of DNA or RNA.

iv. They lack metabolic machinery for synthesis of their own nucleic acid and protein.

7. **Viruses are intracellular obligate parasites. Comment.** (SGD. GII, 2015) (FBD. GI, 2017)

Ans. Viruses are intracellular obligate parasite because viruses lack metabolic machinery for the synthesis of their own nucleic acid and protein. They depend on the host cell to carry out these vital functions. During reproduction in the host cells, viruses may cause diseases.

8. **Write a short note on AIDS.** (GRW. GII, 2017)

Ans. AIDS: AIDS is acronym for Acquired Immune Deficiency Syndrome. It is caused by the human immunedeficiency viruses (HIV).

Symptoms: The symptoms of AIDS include are rare vascular cancer, sudden weight loss, swollen lymph nodes and general loss of immune function.

Prevention:

i. Avoid the direct contact with HIV. ii. Prevent intravenous drugs with common syringe. iii. Use sterile needles/syringes and utensils.

9. **Differentiate between the capsid and capsomere.** (SWL. GI, 2014) (SGD. GII, 2016) (MLN. GII, 2018)

Ans.

Capside	Capsomere
Capsid is a protein coat which surrounds the genome of virus. Capsid gives a definite shape to virus.	Capsid is made up of protein subunits known as capsomeres.

10. **Define parasitology.** (SGD. 2019)

Ans. Parasitology: Study of parasites including, structure, mode of transmission, life histories, Host-parasite relationship.

11. **What are capsomeres and what is their number in adenovirus?** (SWL. GI, 2016)

Ans. Capsomeres: Capsid is made up of protein subunits known as Capsomeres. The number of capsomeres is characteristics of a particular virus.

Adenovirus Capsomeres: There are 252 capsomeres in the capsid of adenoviruses which cause some common cold.

12. **How Hepatitis A is transmitted?** (GRW. GII, 2014)

Ans. Hepatitis A is transmitted by contact with faeces from infected individuals.

13. **How virion differ from prion?** (SGD. GI, AJK. GI, 2016) (LHR. GI, SWL. GI, RWP. GI, 2017) (DGK. 2019)

Ans.

Virion	Prion
The complete, mature and infectious particle is known as virion. The virions are composed of a central core of nucleic acid, **the genome,** and is surrounded by a protein coat, **the capsid.**	Prions are microorganism and are composed of protein only that contains the information that codes for their own replication. Prions are responsible for mad cow infection and mysterious brain infection in man.

14. Differentiate between lysogeny and induction in bacteria. (AJK. GI, 2017)

Ans.

Lysogeny in Bacteria	Induction in Bacteria
i. It is the incorporation of phage DNA into bacterial DNA. ii. Phage DNA does not replicate and does not form new phage viruses iii. No lysis of bacterium takes place	i. It is detachment of phage DNA from bacterial DNA. ii. Phage virus starts replication and new phages are formed. iii. Lysis of bacterium takes place.

15. Write four symptoms of AIDS. (GRW. GII, 2015) (MLN. GII, 2015)

Ans. Four symptoms of AIDS:

i. Rare vascular cancer
ii. Sudden weight loss
iii. Swollen lymph nodes
iv. General loss of immune function

16. Write the names of Five Kingdoms.

Ans. Five Kingdoms:

i. Prokaryotae ii. Fungi iii. Protoctista iv. Plantae v. Animalia

17. Differentiate between lytic and lysogenic phage. (LHR. GI, 2014) (SGD. GI, 2015) (DGK. GI, 2016)

Ans.

Lytic Phage	Lysogenic Phage
Lytic phage undergoes lytic cycle in which phage viral nucleic acid immediately after entering the host cell, takes the control of the host's biosynthetic machinery and induces the host cell to synthesize viral DNA and proteins. As new bacteriophages are formed, bacterial cell burst, i.e., it undergoes lysis. Newly formed phages are released to infect the bacteria and another lytic cycle begins.	Lysogenic phage undergoes lysogenic cycle in which phage viral DNA, instead of taking over the control of host's machinery, becomes incorporated into the bacterial chromosome. Phage in this state is called prophage. Each time the bacterial chromosome is replicated, the prophage also is replicated, and hence all daughter bacterial cells are infected with the prophage.

18. What is induction? (SGD. GI, 2016)

Ans. Induction: Induction is a process in which viral DNA gets detached from the host's Chromosomes and lytic cycle starts.

19. Write the name of two viral diseases and their causative agents. (SGD. GI, 2015)

Ans.

Names of Viral Diseases	Causative Agents
AIDS	HIV (Human Immunodeficieny Virus)
Hepatitis B	HBV (Hepatitis B Virus)
Tobacco mosaic disease	TMV (Tobacco mosaic Virus)

20. What is herpes simplex? (AJK. GI, 2015)

Ans. Herpes Simplex: In Herpes Simplex disease, vast lesions in the epithelial layers of ectoderm tissues are formed. Most commonly this disease occurs in the mouth, on the lips and at other sites in Human beings.

21. Write names of four common human viral diseases. (LHR. GI & GII, 2016) (GRW. GI, 2017)

Ans. Four common human viral diseases:

i. Small pox ii. Herpes simplex iii. Influenza iv. Mumps

22. **What is Hepatitis? How is it caused?** (GRW. GI, 2015)

Ans. **Hepatitis:** Hepatitis is an inflammation of the liver.

Causes of Hepatitis: Hepatitis is usually caused by viral infection, toxic agents or drugs.

23. **What are Pocks?** (LHR. GI, 2016)

Ans. **Pocks:** In small pox, raised fluid filled vesicles are formed on the body which become pustules later on and form pitted scars, the pocks.

24. **Write a note on polio.** (DGK. GII, 2015)

Ans. **Polio:** Polio or Poliomyelitis caused by polio virus is found all over the world. It occurs mostly in childhood. The age at which primary infection occurs varies with social and economic factors. The polioviruses are the smallest known viruses and contain RNA in spherical capsid.

25. **Write down symptoms and preventions of hepatitis.** (GRW. GI, 2014) (GRW. GII, 2015)

Ans. **Symptoms of Hepatitis:** Hepatitis is characterized by jaundice, abdominal pain, liver enlargement, fatigue, loss of appetite and sometime fever.;

Precautions of Hepatitis: Hepatitis can be controlled by adopting hygienic measures, with routine vaccination and screening of blood organ / tissues of the donor.

26. **Differentiate between virulent and non virulent phages.** (DGK. GI, 2017)

Ans.

Virulent Phage	Non- virulent phage
Bacteriophages that replicate within bacteria and destroy them are known as virulent phages.	Bacteriophages that coexist for a time within bacteria without replicating in or destroying them is called Non- virulent phages.

27. **What is a virion?** (FBD. 2018)

Ans. **Virion:** The complete, mature and infectious particle is known as virion.

28. **Write down the cause of measles and small pox.** (MLN. GI, 2018)

Ans. **Cause of Measles:** Measles is caused by virus belonging to group paramyxoviruses.

Cause of small Pox: Small pox is caused by poxviruses (the DNA enveloped virus).

29. **What is HIV?** (DGK. GI, 2018)

Ans. **HIV:** Human Immunodeficiency Virus (HIV) is a virus which is responsible for Aquired Immune Deficiency Syndrome (AIDs). It was discovered in 1984 by research teams from Pasture institute in France and National institute of Health in USA.

30. **Give disadvantages of common names.** (LHR. GII, 2019)

Ans. **Disadvantages:** Since no system was used in choosing common names. In many cases various regions had their own names for the same plant or animal. A single name refers to several different plants or animals. The word "black bird" would mean a crow as well as raven. Common names have no scientific basis.

31. **Compare prophage with provirus.** (FBD. GII, 2019)

Ans. **Comparison between Prophage and Provirus:** An integrated virus in a bacterial genome is called a prophage while an integrated virus in a eukaryotic genome is called provirus.

32. **What is plasmid? Give its importance.** (MLN. GII, 2019)

Ans. **Plasmid:** Plasmids are important vectors, in modem genetic engineering techniques. They often contain drug resistant, heavy metals, disease and insect resistant gene on them.

(SWL. 2019)

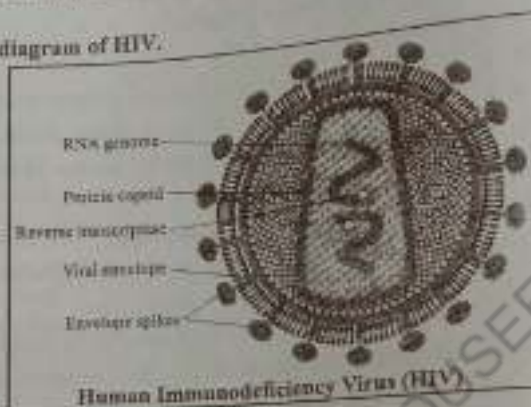
33. **What are mumps and measles?**

Ans. **Mumps and Measles:** Mumps and measles viruses belong to group paromyxoviruses. They are large enveloped RNA viruses. Mumps is highly contagious wide spread but seldom fatal. About 60% of adults are immune to it. Measles is one of the commonest diseases of the childhood and human population. This disease develops immunity in its victim.

(RWP. 2019)

34. **Draw labelled diagram of HIV.**

Ans.

Human Immunodeficiency Virus (HIV)

35. **State the contribution of carlous Linnaeus in Biology.**

Ans. Carlous Linnaeus introduced a system of naming of organisms called Binomial Nomenclature.

ESSAY TYPE QUESTIONS

Q1. **Give biological classification of corn plant.** (FBD. GI, 2014) (SGD. GI, 2016)

Q2. **Describe Linnaeus system of Binomial nomenclature in detail.** (LHR. GII, RWP. GI, 2015)

Q3. **Discuss the five Kingdom system of classification proposed by Robert Whittaker.** (GRW. GI, SGD. GII, 2016) (FBD. GI, 2017) (AJK. 2018) (SWL. 2019)

Q4. **Write a note on structure of viruses.** (RWP. GI, MLN. GI, 2016) (SWL. GI, 2017)

Q5. **Describe Life Cycle of Bacteriophages. (labelled diagrams)** (MLN. GI, DGK. GII, AJK. GI, 2015) (GRW. GI, SWL. GI, RWP. GI, 2016) (LHR. GI, RWP. GII, DGK. GII, 2017) (LHR. GI & GII, FBD. GI & GII, MLN. GI, 2019)

Q6. **Sketch the infection cycle of HIV.** (GRW. GI & GII 2014) (GRW. GII, 2015) (AJK. GI, DGK. GI, 2016) (MLN. GII, 2017)

Q7. **Explain structure of bacteriophage.** (GRW. GI, 2017) (MLN. GI, 2018)

Q8. **Give some viral diseases, which are common in Pakistan.** (LHR. GI & GII, FBD. GI, 2019)

Q9. **Write a note on Acquired Immune Deficiency Syndrome (AIDS).** (MLN. GI, DGK. GI, 2014) (LHR. GII, RWP. GI, DGK. GI, 2015) (DGK. GII, 2016) (RWP. GI, DGK. GII, RWP. GI, 2017) (MLN. GII, DGK. GI, AJK. 2018) (MLN. GII, 2019)

Q10. **What is Hepatitis? Enlist the symptoms and discuss its different types in detail.** (SWL. GI, 2014) (FBD. GI, 2015) (LHR. GII, 2017) (GRW, SGD, DGK, 2019)

Q11. **Write a note on small-pox and polio.**

Q12. **Explain lytic cycle of virus in bacteria.** (LHR. GI, 2018)

Q13. **Describe lysogenic cycle in bacteriophage.** (LHR. GII, 2018)

Q14. **Define virus. Write a note on the characteristics of viruses.** (FBD. 2019) (DGK. GII, RWP. 2018) (RWP. 2019)

CHAPTER 06

Kingdom Prokaryotae (Monera)

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. **Example of Apicomplexans is:** (GRW. GII, 2015)
   (A) vorticella **(B) plasmodium** (C) stentor (D) amoeba
2. **Cell wall of Archaeobacteria do not contain:** (MLN. GII, 2016)
   (A) Peptidoglycan (B) Cellulose (C) Chitin (D) Cutin
3. **"Germ theory of disease" was formulated by:** (LHR. GI, 2017) (AJK. 2018)
   (A) Robert Koch (B) Louis Pasteur (C) Edward (D) Christian Gram
4. **Which one of the following is a microaerophilic bacterium?** (LHR. GI, 2014) (GRW. GII, 2017) (SWL. 2018)
   (A) Compylobacter (B) Pseudomonas (C) Spirochete (D) E.coli
5. **Mesosomes are internal extensions of the:** (LHR. GII, 2014) (LHR. GII, 2016) (LHR. GI, 2018)
   (A) Cell wall (B) Capsule **(C) Cell membrane** (D) All these
6. **Some bacteria breakdown the proteins of dead plants and animals and release:** (AJK. GII, 2014)
   (A) Sulophates (B) Phosphates **(C) Nitrates** (D) Carbonates
7. **Bacteria increase in number by asexual mean of reproduction:** (LHR. GI, 2014)
   (A) Binary fission (B) Budding (C) Regeneration (D) Multiple fission
8. **If tuft of flagella is present only at one pole of bacteria then these are called as:** (FBD. GI, SGD. GI, 2014) (LHR. GI, 2016) (MLN. GI, 2017)
   (A) Monotrichous (B) Peritrichous (C) Amphitrichous **(D) Lophotrichous**
9. **The word "Antibiotic" is:** (RWP. GI, 2014)
   (A) Italian (B) Latin (C) French **(D) Greek**
10. **Primary function of flagella is to help in:** (RWP. GII, 2015)
    (A) Walking **(B) Motility** (C) Running (D) Rest
11. **Misuse of penicillin may cause:** (RWP. GII, 2016)
    (A) Fever (B) Deafness
    (C) Allergy (D) discoloration of teeth
12. **Pili are made up of special protein called:** (LHR. GI, 2015) (FBD. GII, 2019)
    (A) Pilin (B) Flagellin (C) Tubulin (D) Myosin
13. **The dormant, thick walled, desiccation resistant forms in bacteria are:** (FBD. GI, 2014) (MLN. GII, 2017)
    (A) Spore **(B) Cyst** (C) Plasmid (D) Nucleoid
14. **Bacterial flagella originate from:** (SGD. GI, 2017)
    (A) Cell wall **(B) Basal body** (C) Capsule (D) Slime
15. **Bacterial pathogenicity is due to:** (DGK. GII, 2015)
    (A) Cell wall (B) Capsule **(C) Slime** (D) Cell envelope
16. **Mesosomes are invagination of:** (MLN. GI, 2017)
    (A) Cell wall **(B) Cell membrane**
    (C) Nuclear membrane (D) Tonoplast
17. **Pili are primarily involved in a mating process between cells called:** (MLN. GII, 2017) (MLN. GII, 2019)
    (A) Conjugation (B) Translocation (C) Transformation (D) Binary fission

18. **Bacterial Cell Membrane also contains enzyme for:** (BWP. GII, 2016)
(A) Respiration (B) Photosynthesis (C) Both A and B (D) None

19. **Important vectors in modern genetic engineering techniques are:** (GRW. GI, 2016) (BWP. GI, 2017)
(A) Mesosomes (B) Ribosomes (C) Plasmids (D) Nucleoid

20. **Rod shaped bacteria are called:** (BWP. GI, 2016)
(A) Cocci (B) Bacilli (C) Spirilla (D) Vibrio

21. **A cube of eight cocci is termed as:** (MLN. GI, 2017) (FBD. SGD. 2019)
(A) Tetrad (B) Sarcina (C) Diplococcus (D) Streptococcus

22. **Chemical substance used on living tissues that inhibit the growth of microorganisms are called:** (DGK. GI, 2014)
(A) Disinfectants (B) Antiseptics
(C) Chemotherapeutic agents (D) Antibiotics

23. **Oval shaped bacteria are:** (BWP. GI, 2017)
(A) Spirilla (B) Vibrio (C) Cocci (D) Bacilli

24. **________ is an anaerobic bacterium.** (MLN. GI, 2014) (BWP. 2019)
(A) Pseudomonas (B) E.coli (C) Spirochete (D) Campylobacter

25. **E.Coli is a example of:** (BWP. GI, 2014)
(A) Aerobic Bacterium (B) Anaerobic Bacterium
(C) Facultative Bacteria (D) Microaerophilic Bacteria

26. **The bacteria which can grow either in presence or absence of oxygen are called:** (BWP. GI, 2016)
(A) Facultative bacteria (B) Aerobic bacteria
(C) Microaerophilic bacteria (D) Anaerobic bacteria

27. **Name the cyanobacteria which are helpful in fixing atmospheric nitrogen.** (FBD. GI, 2014)
(A) Heterocyst (B) Akinetes (C) Nostoc (D) Hormogonium

28. **Asexual reproduction in bacteria occurs by:** (FBD. GI, 2019)
(A) Conjugation (B) Transduction (C) Transformation (D) Binary Fission

29. **The most ancient bacteria are:** (SWL. GI, 2017)
(A) Eubacteria (B) Escherichia coli (C) Archaeobacteria (D) Streptococci

30. **The bacteria that cause diseases in human beings, are called:** (BWP. GII, 2014)
(A) Phytosynthetic bacteria (B) Facultative bacteria
(C) Chemosynthetic bacteria (D) Pathogenic bacteria

31. **When cocci occur in pairs, their arrangement is:** (LHR. GII, 2018)
(A) Tetrad (B) Diplococcus (C) Sarcina (D) Streptococci

32. **Cysts are dormant, thick-walled, desiccation resistant forms and develop during:** (MLN. GI, 2018)
(A) Late stage of cell growth (B) Differentiation of vegetative cells
(C) Differentiation of reproductive cells (D) During conjugation

SHORT ANSWER QUESTIONS

1. **Differentiate between lophotrichous and amphitrichous.** (LHR. GII, 2017) (MLN. GI, 2019)

Ans.

Lophotrichous	Amphitrichous
If tuft of flagella is present only at one pole of bacteria then these are lophotrichous flagell.	A amphitrichous is a condition when tuft of flagella at each of two poles is present.

2. What are nucleoid? (BWP. GI. 2016)

Ans. The nuclear material or DNA in bacterial cells is a single, circular and double stranded. It aggregates as an irregular shaped dense area called nucleoid or chromatin body.

3. What do you known about huge bacterium? (AJK. GI. 2017)

Ans. Huge Bacterium:

i. Epulopiscium fisheisoni is a huge bacterium discovered in the intestine of the brown surgeonfish Acanthurus nigrofuscus.

ii. Huge bacterium grows as large as 600 um by 80 um, a little smaller than a printed hyphen.

4. How photosynthesis in bacteria is different from green plants? (AJK. GI. 2016)

Ans. During photosynthesis bacteria use hydrogen sulphide (H_2S) instead of water as hydrogen source and liberate sulphur instead of oxygen. In most green plants chlorophyll is present within chloroplast while bacterial chlorophyll is dispersed in the cytoplasm.

5. Differentiate between aerobic and anaerobic bacteria. (BWP. GI. 2016) (GRW. GI. 2017)

Ans.

Aerobic bacteria	Anaerobic bacteria
Bacteria which can grow in the presence of oxygen are called aerobic bacteria.	Bacteria which can grow in the absence of oxygen are known as anaerobic bacteria.

6. Name three general shapes of bacteria and explain any one. (LHR. GII. 2015)

Ans. Shapes of Bacteria: On the basis of general shape, bacteria are classified as under:

i. Cocci ii. Bacilli iii. Spiral

Spiral Bacteria: The spiral shaped bacteria are spirally coiled. Spirals come in one of three forms as under:

i. Vibrio: Vibrio is curved or comma shaped rod.

ii. Spirillum: Spirillum is a thick, rigid spiral.

iii. Spirochete: Spirochete is a thin, flexible spiral. Examples of spiral shaped bacteria are Vibrio, Hyphomicrobium etc.

7. What are pili? Give their functions. (BWP. GI. 2015) (LHR. GII. FBD. GI. 2014)

Ans. Pili: Pili are hollow, non helical, filamentous appendages. Pili are smaller than flagella. They are made up of special protein called pilin. True pili are only present on gram negative bacteria.

Functions of Pili:

i. Pili are primarily involved in a mating process between cells called conjugation process.

ii. Some pili function as a means of attachment of bacteria to various surfaces.

iii. Pili are not involved in motility.

8. Differentiate between slime and capsule. (BWP. GI. 2015)

Ans.

Slime	Capsule
i. Some bacteria are covered with loose, soluble shield of macromolecules which is called a slime capsule.	i. Bacteria produce capsule which is made up of repeating polysaccharide units, and of protein or of both. Capsule is tightly bound to the cell.
ii. Slime provides great pathogenicity to bacteria and protects them against phagocytosis.	iii. Capsule has a thicker, gummy nature that gives sticky characters to colonies of encapsulated bacteria.

9. Discuss E.coli genome: (FBD. GI. 2014)

Ans. E.coli Genome: Escherichi coli closed circle chromosome measures approximately

14000um.

10. **What are plasmids and what is their role in genetic engineering?** (SWL. GII. 2016)

Ans. Many bacteria have plasmids in addition to main chromosomes. They are the circular, double stranded DNA molecules. They are self replicating, and are not essential for bacterial growth and metabolism. They often contain drug resistant, heavy metals, disease and insect resistant genes on them. Plasmids can be extracted and used as vector to carry foreign gene in to the host bacteria during genetic engineering processes.

11. **Name four phases of bacterial growth.** (SWL. GI. 2016)

Ans. Four phases of bacterial growth are Lag phase, log phase, stationary phase and decline phase.

12. **What are plasmids? Give their significance.** (SWL. GI, RWP. GI. 2016) (GRW. 2016)

Ans. **Plasmids:** Plasmid is an **extrachromosomal DNA** present in bacteria. These are circular, double stranded DNA molecules and are **self replicating**. They are not essential for bacterial growth and metabolism.

Significance:

i. Plasmids are important vectors in modern genetic engineering techniques.

ii. Plasmids often contain drug resisting, heavy metals, disease and insect resistant genes on them.

13. **Write physical methods to control bacteria.** (GRW. GII, 2017) (RWP. 2015)

Ans. **Physical method:** The method in which physical agents are used to control microorganism is called physical method. Following are some physical methods to control bacteria.

i. **Sterilization:** In this method, we use steam, dry heat gas, filtration and radiation to control bacteria is known as sterilization. Sterilization is a destruction of all life forms.

ii. **High temperature:** High temperature is usually used in microbiological labs. for control of microbes. It has an effect on cellular enzyme system. Therefore it will affect the rate of chemical reaction thus causing death of micro-organisms. Both dry heat and moist heat are effective. Moist heat cause coagulation of proteins and kill the microbes. Dry heat causes oxidation of chemical constituents of micro-organisms and kills them.

iii. **Radiations:** Certain electromagnetic radiations below 300 nm are effective in killing of micro-organisms. Generally, the gamma rays are used for sterilization process.

iv. **Membrane filters:** Heat sensitive components like antibiotics, serum, hormones etc. can be sterilized by means of membrane filters.

14. **What are mesosomes? Write their role.**
(GRW. GI, FBD. GI. 2014) (GRW. GI, 2015) (SGD. GI, RWP. GI. 2016) (RWP. GI, BWP. GI. 2017)

Ans. **Mesosomes:** The cell membrane of bacteria invaginates into the cytoplasm forming structure called as mesosome. Mesosomes are in the form of vesicles, tubules or lamellae.

Functions of mesosomes:

i. Mesosomes are involved in DNA replication.

ii. Mesosomes are involved in cell division.

iii. Some mesosomes are involved in export of exocellular enzyme.

iv. Respiratory enzyme are present on the mesosomes.

15. Differentiate between Gram-positive and Gram negative Bacteria. (MLN. GI. 2016) (FBD. GI. 2017) (FBD. 2018)

Ans.

Gram Positive Bacteria	Gram Negative Bacteria
i. Gram positive bacteria are stained purple.	i. Gram negative bacteria are stained pink.
ii. Number of major layer is one in gram positive bacteria as there is one outer membrane.	ii. Number of major layer is two in gram negative bacteria with outer membrane.
iii. Periplasmic space is present in some gram positive bacteria.	iii. Periplasmic space is present in all gram negative bacteria.
iv. Gram positive bacteria are more permeable.	iv. Gram negative bacteria are less permeable.

16. What is difference between bacterial cell membrane and eukaryotic cell membrane? (DGK. GII. 2016)

Ans. Bacterial cell membrane differ from eukaryotic cell membrane in lacking **sterols** such as **cholesterol**.

17. Write down classification of bacteria on the basis of shapes. (LHR. GI. 2014) (DGK. GII. 2017)

Ans. On the basis of general shape, bacteria are classified into following three categories.

i. Cocci — round shape bacteria
ii. Bacilli — rod shape bacteria
iii. Spiral — spring like bacteria

18. Write the difference between saprophytic and parasitic bacteria. (LHR. 2008)

Ans.

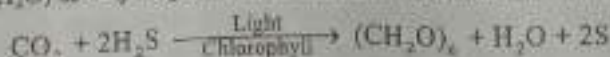
Saprophytic Bacteria	Parasitic Bacteria
i. They feed on dead organic matter.	i. They feed on living organic matter
ii. They live in the soil and get their food from dead organic matter.	ii. They multiply within the living organisms where they digest the tissues and produce toxins that lead to disease.
iii. They have very extensive enzyme system that breaks down complex substances into simple ones that are absorbed and utilized by there bacteria as energy source.	iii. They lack certain complex systems of enzymes.

19. What are Photosynthetic bacteria? Give two examples. (AJK. GI. 201[illegible])

Ans. Photosynthetic bacteria:

i. Photosynthetic bacteria possess chlorophyll which differs from the chlorophyll of gree[n] plants. Unlike most green plants, which have their chlorophyll in chloroplasts, bacteria[l] chlorophyll is dispersed in the cytoplasm.

ii. During photosynthesis the autotrophic bacteria utilize hydrogen sulphide (H_2S) inste[ad] of water (H_2O) as a hydrogen source and liberate sulphur instead of oxygen.

$$CO_2 + 2H_2S \xrightarrow[\text{Chlorophyll}]{\text{Light}} (CH_2O)_x + H_2O + 2S$$

Examples: i. Green Sulphur Bacteria ii. Purple Sulphur Bacteria

(DGK, GI, 2016) (LHR, GI, 2017)

20. Distinguish antiseptics from disinfectants.

Ans.

Antiseptics	Disinfectants
These are chemical agents used to destroy pathogens on living object such as a tissue of human body. They are used on body tissues such as on a wound or before piercing the skin to take blood. **Example:** Tincture of iodine, silver nitrate, 70% ethyl alcohol etc.	Chemical agents used to destroy pathogens on lifeless object such as a table top are known as disinfectants. They are used on inanimate objects such as table top or equipments used in a surgical operation. **Example:** Potassium permanganate, alcohol, formaldehyde.

(LHR, GI, 2017) (SWL, 2016)

21. Differentiate between spore and cyst.

Ans.

Spore	Cyst
Spore is metabolically dormant bodies. It is produced at a late stage of cell growth. It is resistant to adverse physical environment condition such as light, high temperature, desiccation, pH and chemical agents. Under favourable conditions it germinates and form vegetative cell. Spore may be elliptical and centrally located, spherical and terminally located, or ovoid but sub-terminally located.	Cyst is dormant, thick walled, desiccation resistant form. It develops during differentiation of vegetative cells which can germinate under suitable condition. It is not heat resistant.

(LHR, GI, 2014)

22. Write down functions of cell wall and flagella in bacterial cell.

Ans. Functions of cell wall in Bacterial cell:

i. It protects the bacterium from osmotic lyses.
ii. It determines the shape of the bacterium.

Functions of flagella in bacterial cell:

i. Flagella help in motility of bacterium.
ii. They are involved in chemotaxis i.e. they detect and move in response to chemical signals.

23. Write a few lines on misuse of antibiotics.

(GRW, GI, 2014) (LRW, GI, 2015) (LHR, GI, 2016) (MLN, GI, 2016)

Ans. Misuse of Antibiotics: Misuse of antibiotics results in problems like drug resistance in micro-organisms ultimately resistance against disease treatments. Misuse antibiotics can interact with the human metabolism and in severe cases can cause death of human beings.

i. Misuse of penicillin can cause allergic reactions.
ii. Streptomycin can affect auditory nerves causing deafness.
iii. Tetracycline and its related compounds cause permanent discoloration of teeth in young children.

24. What are trichomes? Give the structure and function of Heterocysts.

(RWP, GI, 2014) (FBD, GI, 2015) (DGK, GI, 2017)

Ans. Trichome: Trichome is a chain of cells of cyanobacteria. When trichome is surrounded by mucilaginous sheath, it forms **filaments** of colony of cyanobacteria.

Structure of Heterocysts: Heterocysts are large, round, light yellowish thick walled cells present at intervals in trichome of cyanobacteria.

Function of Hetrocysts:

i. Trichome of cyanobacteria mostly breaks near heterocyst and forms harmogonia and thus help in fragmentation.
ii. Heterocysts are helpful in the fixation of atmospheric nitrogen.

25. Give structure and composition of bacterial cell wall. (MLN, GII, 2017)

Ans. Bacterial cell wall is a multilayered structure located external to the cytoplasmic

membrane. It is composed of an inner layer of peptidoglycan and outer membrane that varies in thickness and chemical composition depending upon the bacterial type. Peptidoglycan is composed of frame work of long glycan chains cross linked with peptide fragments.

26. **Differentiate between Monotrichous and Lophotrichous Bacteria.** (MLN. GII. 2016)

Ans.

Monotrichous Bacteria	Lophotrichous Bacteria
Monotrichous bacteria possess a single polar flagellum.	Lophotrichous bacteria have a tuft of flagella at one end.

27. **Distinguish lag phase from log phase of bacterial growth curve.** (RWP. GI. 2014)

Ans.

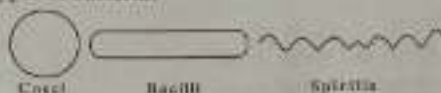
Lag phase	Log phase
It is phase of no growth. Bacteria prepare themselves for division.	It is phase of rapid growth. Bacteria divide at exponential rate.

28. **Name a bacterium that has no cell wall.** (SWL. GI. 2015)

Ans. Mycoplasma is the bacterium which has no cell wall.

29. **Give a sketch of three types of bacteria.** (FSD. GII. 2014)

Ans. **sketch of three types of bacteria:**

Cocci Bacilli Spirilla

30. **Define binary fission.** (RWP. GI. 2016)

Ans. **Binary Fission:** It is an asexual process by which a bacterial cell divides to form two new cells.

31. **What are the functions of flagella, pili, slime and capsule in bacterial cell?** (RWP. GII. 2014)

Ans. **Functions of flagella in bacterial cell:**

i. They help in motility.

ii. Flagella also help the bacteria to detect and move in response to chemicals, a process known as chemotaxis.

Function of pili in bacterial cell:

i. They are involved in conjugation process.

ii. Some pili function as a means of attachment of bacteria to various surfaces.

Function of slime in bacterial cell

Slime provides greater pathogenecity to bacteria and protects them against phagocytosis.

Function of capsule in bacterial cell:

i. Capsule may provide the cell with protein against phagocytosis by other micro organisms or by the host's white blood cells.

ii. Capsule protects the cell against dehydration.

32. **Differentiate between Antibiotics and Antiseptics with examples.** (MLN. GII. 2018)

Ans.

Antibiotics	Antiseptics
Antibiotics are chemotherapeutic chemical substance which are used in treatment of infectious diseases. **Examples:** Streptomcin, Tetracycline	Chemical substances used on living tissues that inhibit the growth of micro organisms are called antiseptics. **Examples:** Hydrogen peroxide solution.

33. **Differentiate between flagellum and flagellin.** (DGK. GII. 2018)

Ans.

Flagellum	Flagellin
Flagellum is extremely thin, hair like in appendage which helps in the locomotion of an organism.	Flagellin is a protein. Flagellum is made up of falgellin.

(LHR. GI, MLN. GI, 2019)

34. **What is capsid and capsomeres?**

Ans. The complete, mature and infection particle is known as viron. The virons are composed of a central core of nucleic acid, either DNA or RNA. Which is known as the genome and is surrounded by a protein coat, the capsid. Capsid give a definite shape to viron. Capsid is made up of protein subunits known as capsomeres. The number of a capsomeres is a characterties of a virus.

(SWL. 2019)

35. **How respiration occurs in bacteria?**

Ans. **Respiration:** There are four types of bacteria on the basis of type of respiration.

i. **Aerobic Bacteria:** Which grow in the presence of free oxygen.

Example: Pseudomonas

ii. **Anaerobic Bacteria:** Which grow in the absence of oxygen.

Example: Spirochete

iii. **Facultative Bacteria:** Which can grow either in the presence or absence of free molecular oxygen.

Example: E.Coli

iv. **Microaerophilic Bacteria:** Which require a low concentration of free or molecular oxygen for growth.

Example: Campylobacter

(AJK. 2019)

36. **Differentiate slime molds and water molds.**

Ans. **Difference between slime molds and water molds:**

Slime Molds	Water Molds
i. Resemble plants enclosed in cell wall made of cellulose.	i. Live in water and damp soil.
ii. Resemble animals during life cycle have flagellated cells.	ii. Phytophthora infestans late blight of the potato responsible for the death of million of Irish people.

ESSAY TYPE QUESTIONS

Q1. **Describe different classes of bacteria on the basis of flagella.**
(GRW. GI, 2014) (GRW. GII, 2015) (GRW. DGK. GII, 2018)

Q2. **Discuss about bacterial cell wall.**
(FBD. GI, 2015)

Q3. **Compare Gram positive and Gram negative bacteria on the basics of cell wall.**
(LHR. GII, SGD. GI, 2016)

Q4. **Write a note on the cell envelope of bacteria.**
(MLN. GI, 2017)

Q5. **Discuss the process of Nutrition in Bacteria.**
(GRW. GI, 2014)
(LHR. GII, GRW. GI, SWL. GI, BWP. GI, AJK. GI, 2015) (LHR. GI, FBD. GI, GRW. GI, SWL. GI, 2016)
(BWP. GI & GII, LHR. GII, 2017) (LHR. GII, DGK. GI, AJK. 2018) (LHR. GI, 2019)

Q6. **Discuss growth and reproduction in bacteria.**
(LHR. GI, 2015) (AJK. GI, 2016) (SWL. GI, 2017) (SGD. 2019)

Q7. **Describe different physical and chemical methods to control bacteria.**
(LHR. GI, MLN. GI, 2014) (DGK. GI, DGK. GI, BWP. GI, 2016) (SGD, BWP, 2018) (DGK, 2019)

Q8. **Write a note on use and misuse of antibiotic.**
(BWP. GI, 2014) (MLN. GI, 2015) (MLN. GI, SGD. GI, 2016) (FBD. GI, LHR. GI, 2017) (FBD. GI, 2019)

Q9. **Write a note on cyanobacteria.**

Q10. **Give physical methods to control microorganisms.**
(DGK. GI, 2015)

Q11. **Write a note on respiration and growth in bacteria.**
(MLN. GI, 2018)

Q12. **Describe different shapes of bacteria.**
(SWL. BWP. 2018)

(FBD. GII, 2019)

****

The Kingdom Protista (or Protoctista)

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. **Parasitic protozoan thatz form spores at some stage in their life belong to:** (LHR, GII, 20
   (A) Ciliates (B) Zooflagellates **(C)** Apicomplexans (D) Actinopods
2. **Which are the major producers in aquatic ecosystem?** (LHR, 20
   (A) Green algae **(B)** Diatoms (C) Euglenoids (D) Red algae
3. **Which of the following is not present in protists?** (SGD, GI, 20
   (A) Flagella **(B)** Embryo (C) Cilia (D) None of These
4. **Algae, in which body is differentiated into blades, stripes and hold fast, belong to:** (LHR, GII, 20
   (A) Golden algae (B) Diatoms **(C)** Brown algae (D) Green algae
5. **The closest relatives of fungi are probably:** (GRW, GII, 20
   (A) Aschelminthes (B) Diatoms **(C)** Slime molds (D) Ferns
6. **Trypanosoma is an example of:** (GRW, GI, 2014) (MLN, GI, 2017) (LHR, GII, 20
   (A) Actinopods **(B)** Zooflagellates (C) Apicomplexans (D) Ciliates
7. **Protozoans having two kinds of nuclei:** (FBD, GI, 2015) (SGD, 20
   (A) Amoeba (B) Zooflagellates **(C)** Ciliates (D) Actinopods
8. **Ecologically, dinoflagellates are one of the most important group of:** (FBD, GII, 20
   (A) Decomposer (B) Secondary consumer
   (C) Producer (D) Primary consumer
9. **Amoebic dysentery in:** (GRW, GI, 20
   (A) Amoeba **(B)** Entamoeba histolytica
   (C) Trypanosoma (D) Plasmodium
10. **African sleeping sickness is transmitted by:** (DGK, GI, MLN, GII, 2
    (A) Trypanosoma (B) Mosquito (C) Tsetse fly (D) Plasmodium
11. **The phylum which is exclusively marine is:** (AJK, GII, 2
    (A) cnidaria (B) porifera **(C)** echinodermata (D) annelida
12. **Euglena is included in Kingdom:** (BWP, GII, 2
    (A) Monera **(B)** Protista (C) Fungi (D) Plantae
13. **Which one belongs to Actinopodes?** (DGK, GII, 2
    (A) Trypanosoma (B) Plasmodium (C) Verticella **(D)** Radiolarians
14. **Amoebae moves by forming specialized cytoplasmic projection called:** (GRW, 2
    (A) cilia **(B)** pseudopodia (C) flagella (D) tube feet
15. **Fresh water sponge is:** (FBD, GI, 2
    (A) Sycon (B) Leucosolenia **(C)** Spongilla (D) Euplectella
16. **Laminaria is an example of:** (SWL, 2
    (A) Red algae (B) Diatoms (C) Green algae **(D)** Brown algae
17. **Pelomyxa Palustris is commonly called:** (SGD, 2
    (A) Entamoeba (B) Trypanosoma (C) Trichonympha **(D)** Giant amoeba

SHORT ANSWER QUESTIONS

1. **Write two distinguishing characters of kingdom protista.** (LHR. GII, DGK. GI, 2016) (DGK. GII, 2017)

Ans. Characteristics of Kingdom Protista:

i. Protists do not develop from a blastula or an embryo.

ii. Protists are polyphyletic group of organisms as they do not share a single common ancestor.

2. **Why Kingdom protista is regarded as a polyphyletic group of organism?** (SWL. GI, 2017)

Ans. Kingdom protista is regarded as a polyphyletic group of organism because of diversity in their size and structure, means of locomotion, ways of obtaining nutrients, interactions with other organisms, habitat and modes of reproduction do not share a single common ancestor.

(MLN. GI, 2016)

3. **Name any four phylum of protoctisa.**

Ans. Four phylum of protoctisa:

i. Englenophyta ii. Chlorophyta iii. Rhodophyta iv. Phacophyta

(DGK. GII, 2016)

4. **Write a note on plasmodium causing disease.**

Ans. Plasmodium is the apicomplexan which cause malaria. It enters human blood through the bite of an infected female anopheles mosquito.

i. Plasmodium first enters liver cells and then red blood cells, where it multiplies.

ii. When each infected RBC cell bursts, many new parasites are released.

iii. The released parasites infect new RBCs and the process is repeated. The simultaneous bursting of millions of RBCs causes the symptoms of malaria. Symptoms of malaria: chill, followed by higher fever, caused by toxic substances that are released and affect other organs of the body.

5. **Name six groups of animal like protists.** (SWL. GI, 2017)

Ans. Six groups of animal like protists:

i. Amoebas ii. Zooflagellates iii. Actinopods

iv. Forminifera v. Apicomplexans vi. Ciliates

6. **Write down two similarities and differences between fungi and fungus like protists.**
(LHR. GI, GRW. GI, 2014) (RWP. GI, 2015) (SWL. GI, DGK. GII, 2017) (MLN. GI, SWL. 2015)

Ans. Similarities between fungi and fungus like protists:

Some protists superficially resemble fungi in that.

i. They are not photosynthetic.

ii. Some have bodies formed of thread like structures called hypae.

Differences between fungi and fungus like protists

The fungus like protists are not fungi for several reasons.

i. Many of protists have centrioles which is not found in fungi.

ii. They produce cellulose as a major component of their cell walls, whereas fungi have cell walls of chitin.

7. **What do you know about amoeba?** (GRW. GI, 2015)

Ans. Amoeba: Amoebae are protozoans that lack flagella and move by forming specialized cytoplasmic projection called pseudopodia. Amoebae are unicellular with no definite shape.

Examples: Amoeba, Entamoeba

8. Write the two characteristics of zooflagellates.
(SGD. GI, 2014) (LHR. GI, 2016) (BWP. GII, 2017) (BWP. 2018)

Ans. Two characteristics of zooflagellates:

i. Zooflagellates are mostly unicellular, (some are colonial) organisms with spherical or elongated bodies.

ii. Zooflagellates have single central nucleus.

9. Write two benefits each of algae and fungi. (LHR. GII, 2014)

Ans. Benefits of Algae:

i. Algae are major producers of the aquatic ecosystem, thus they play a basic role in food chains, providing food and oxygen to other organisms.

ii. Marine algae are also source of many useful substances like algin, agar, carrageenan and antispeptics.

Benefits of fungi:

i. Fungi are very important as decomposers, and, along with bacteria, play a vital role in the recycling of inorganic nutrients in the ecosystem.

ii. As symbionts, mycorrhizal fungi improve growth of 95% of vascular plants.

10. What are choanoflagellates? (MLN. GI, SWL. GI, 2014) (LHR. GII, 2015)
(FBD. GI, SWL. GI, 2016) (LHR. GI, MLN. GI, 2017) (MLN. GI, RWP. 2018) (BWP. 2019)

Ans. Choanoflagellates: Choanoflagellates are sessile and colonial zooflagellates which are marine or fresh water in habitat, choanoflagellates are attached by a stalk and their single flagellum is surrounded by delicate collar, choanoflagellates are of special interest because of their striking resemblance to collar cells i.e., choanocytes in sponges.

11. Compare forms and locomotion of zooflagellates and ciliates. (BWP. GI, 2014)

Ans.

Zooflagellates	Ciliates
i. Zooflagellates are mostly unicelluar, a few are colonial.	i. Ciliates are unicellular protozoans.
ii. Zooflagellates possess one to many flagella as locomotory structures.	ii. Ciliates contain cilia as locomotory structures.
iii. Choanoflagellates are sessile zooflagellates although they have flagella.	iii. Stentor is a sessile ciliate although having cilia.

12. Give two examples of chlorophyta. (LHR. 2014)

Ans. Examples of chlorophyta: The two examples of chlorophyta are chlorella and ulva.

13. What is Trypanosoma? What disease does it cause?
(LHR. GI, DGK. GII, 2016) (BWP. GI, 2017) (SGD. 2018) (RWP. 2019

Ans. Trypanosoma/Sleeping Sickness: Trypanosoma is a human parasite causing African sleeping sickness. It is transmitted by the bite of infected tsetse fly.

14. What is the function of pellicle in ciliates? (DGK. GII, BWP. GI, 2016

Ans. Function of Pellicle: Ciliates have a flexible outer covering called a pellicle that give them a definite but changeable shape.

15. Differentiate between micronucleus and macronucleus in ciliates.
(SGD. GI, 2014) (GRW. GI, BWP. GI, 2015) (SWL. GI, DGK. GI, 2016) (FBD. GI, 201

Ans.

Micronucleus	Macronucleus
i. Micronuclei are diploid.	i. Macronuclei are polyploid.
ii. Micronuclei are small and one or more in number.	ii. Macronuclei are larger and one in number.
iii. Micronuclei are involved in sexual process.	iii. Macronuclei are involved in controllin cell metabolism and growth.

16. **Give role of Tsetse fly as vector in the transmission of a specific disease.** (MLN. GI. 2014)

Ans. Trypanosoma is a human parasite causing African sleeping sickness. It is transmitted by the bite of infected tsetse fly.

17. **Why pleomyrca palustris may be the most primitive of all Eukaryote like forms?** (MLN. 2014)

Ans. Pleomyrca palustris may be the most primitive of all Eukaryote like forms because they have multiple membrane bounded nuclei but none of the other organelles found in all other eukaryotes including mitochondria. (DGK. GII, 2017)

18. **What is the role of contractile vacuole in fresh water ciliates?**

Ans. Ciliates have special organelles called contractile vacuoles. Contractile vacuoles regulate the water movement in freshwater ciliates. (MLN. GI. 2015)

19. **Basically the kingdom protista is defined by exclusion. How?**

Ans. Basically kingdom protista is defined by exclusion i.e, all members have characteristics that exclude them from the other four kingdoms. (AJK. GII, 2017)

20. **Name four phyla of Algae.**

Ans. **Phyla of Algae:** The four phyla of algae are:

i. Pyrrophyta .... commonly called dinoflagellates
ii. Euglenophyta .... commonly called Euglenoids
iii. Chrysophyta .... commonly called Diatoms
iv. Phaeophyta .... commonly called brown algae

21. **How Algae differ from plants?** (LHR. GI. 2014) (LHR. GI, RWP. GI, 2015) (BWP. GI, 2016) (LHR. GII, MLN. GII, 2017) (GRW. MLN. GI. RWP. 2019)

Ans.

Algae	Plants
i. Sex organs in algae are unicellular.	i. Sex organs in plants are multicellular.
ii. In Algae, zygote is not protected by the parent body.	ii. In plants, zygote is protected by the parent body.
iii. The body is thallus in Algae.	iii. The body is foliose in plants.
iv. Algae are aquatic photosynthetic protists.	iv. Plants are terrestrial photosynthetic producers.

22. **Why green algae are considered as ancestors of green land plants?** (FBD. GII, 2014) (AJK. 2018)

Ans. Green algae are considered as ancestors of plants because:

i. Green algae have pigments chlorophyll a, chlorophyll b and carotenoids similar to plants.
ii. Green algae have cell wall of cellulose similar to plants.
iii. Green algae have starch as main energy reserves just like plants.
iv. RNA sequencing of green algae is similar to plants.

23. **What are reason for migration out of Ireland?** (BWP. GII, 2018)

Ans. Reason for migration out of Ireland was Irish potato famine of the 19th century caused by destruction of several crops of potatoes due to late blight of potatoes (a disease of potato caused by an oomycete phytophthora infestans)

24. **What are pigments found in Algae?** (DGK. GI, 2017)

Ans. **Pigments:** All algae contain photosynthetic pigments. These pigments are green chlorophyll, yellow and orange carotenoids. In addition to these pigments, some algal phyla also contain other pigments like xanthophylls and classified on the basis of their pigment composition.

25. Write a note on Euglenoids. (DGK. GI, 2015) (SGD. GI, 2016) (GRW. GI, RWP. GI, 2017)

Ans. Euglenoids: Euglenoids resemble plants and green algae in having similar pigments. Some phosynthetic euglenoids lose their chlorophyll when grown in drak and obtain their nutrients heterotropically by ingesting organic matter, that is why they also resemble to zooflagellates.

26. Explain red tides. (GRW. GI, 2014) (GRW. GII, 2015) (LHR. GI, 2018) (GRW. MLN. GII, 2019)

Ans. Dinoflagellates are known to have occasional population explosions or blooms. These blooms frequently colour the water orange, red or brown and are known as red tides.

27. Brown Algae includes the giants of the protists kingdom, why? (GRW. GI, 2015)

Ans. Brown Algae includes the giants of the protists kingdom as all brown algae are multicellular and range from a few centimeters to approximately 75 meters in length.

Examples: Focus, Macrocystis.

28. What are kelps? Name the parts of thallus of a kelp? (FBD. GI, MLN. GI, RWP. GI, DGK. GII, 2015) (LHR. GI & GII, RWP. GI, DGK. GII, 2016) (GRW. GI, MLN. GI, 2017) (RWP. 2018) (FBD. GI & GII, 2019)

Ans. Kelps: Kelps are the largest brown algae, tough and leathery in appearance.

Parts of kelps: Kelps possess following parts:

i. Blades (leaf like) ii. Stipes (Stem like)

iii. Hold fast (Root like)

Kelps are common in cooler marine waters, especially along rocky coastlines in the intertidal zone.

Example: Laminaria.

29. Write down the phylum, form, pigments and example of red algae. (RWP. GI, 2014) (LHR. GII, SGD. GI, 2015)

Ans. Phylum: Rhodophyta

Form: Red Algae are multicellular or unicellular.

Pigments: Red Algae contains chl.a, carotenes including phycoerythrin as photosynthetic pigment.

Examples: Chondrus, polysiphonia etc.

30. Give two examples of unicellular green algae. (FBD. GI, RWP. GI, 2016)

Ans. Unicellular Green Algae: i. Chlamydomonas ii. Chlorella

31. Give at least four useful substances obtained from marine algae. (SGD. GI, 2016)

Ans. Useful Substances: i. Algin ii. Agar iii. Carrageenan iv. Antiseptics like tincture of Iodine

32. Give the characters of Oomycotes. (GRW. GI, 2014) (SGD. GII, 2015) (GRW. GI, FBD. GI, 2017)

Ans. Characters of Oomycotes:

i. Oomycotes cell walls contain cellulose. ii. Water molds hyphae are septate.

iii. Water molds have centrioles in their cells.

iv. Water molds are pathogenic organisms e.g., Phytophthora infestans

33. Why euglenoids have special evolutionary significance? (GRW. 2018)

Ans. Euglenoids have special evolutionary significance because they have at various times been classified in the plant kingdom (with algae) and in animal kingdom (in protozoans).

34. How protists are different from other eukaryotes? (FBD. 2018)

Ans. Protists are different from other eukaryotes because they do not develop from a blastula or an embryo.

35. **Why Euglenoids are placed in Algae as well as in Protozoa?** (MLN. GI, 2019)

Ans. Euglenoids have at various times been classified in the plant kingdom (with algae) and in animal kingdom (in protozoans). They are plant like in that their pigments are the same as in plants and green algae. However, some photosynthetic euglenoids lose their chlorophyll when grown in dark and obtain their nutrients heterotropically by ingesting organic matter.

36. **Differentiate between Pseudopodia and Flagella.** (MLN. GII, 2018)

Ans.

Pseudopodia	Flagella
Pseudopodia are specialized cytoplasmic projections which help in locomotion. **Example:** Amoeba has pseudopodia.	Flagella are extremely thin, hair like in appendages. They help in locomotion. **Example:** Most of bacilli spiral shaped bacteria have flagella.

37. **Write down any two characteristics of protists.** (DGK. GI, 2018)

Ans. Two characteristics of Protists:

i. The protests are unicellular, colonial or simple multicellular organisms that possess a eukaryotic cell organization.

ii. Eukaryotic cells, the unifying feature of protests, are common to complee multicellular organisms belonging to the three eukaryotic kingdoms (Fungi, Plantae and Animalia) but clearly differentiate protists from the members of the prokaryotic kingdom (Moenra).

38. **Differentiate between zooflagellates and dinoflagellates.** (LHR. GI, 2019)

Ans. Differences between zooflagellates and dinoflagellates:

Zooflagellates	Dinoflagellates
i. These protists are mostly unicellular (a few are colonial) organism with spherical or elongated bodies, a single central nunleus.	i. Most dinoflagellates are unicellular. Their cells are often covered with shells of inter locking cellulose plates impregnated with silicates.
ii. Flagellates obtain their food either by in gesting living or dead organisms or by absorbing nutrients from dead organic matter. They may be free-living, symbionts or parasites.	ii. Ecologically, dinoflogellates are one of the most important groups of producers (second only to diatoms) in marine ecosystem.

39. **Why euglena is difficult to classify?** (LHR. GI, 2019)

Ans. Euglena do photosynthesis using the some basic process that plant use. They also move around and eats as do animals. That's why it is difficult to classify.

40. **What are the basis of diversity in protista?** (LHR. GII, 2019)

Ans. Protista: Organisms in the kingdom protista have evolved diversity in their 1: size and structural 2: means of locomotion 3: ways of obtaining nutrients 4: interaction with the organisms 5: habitat and 6: modes of reproduction. Diversity is exhibited by all the major protist groups.

41. **Give an example of water molds, why it is notorious?** (GRW. 2019)

Ans. Example: Phytophthora infestans is an example of water mold. Its cell wall contain cellulose, not chitin. Their hyphae are aseptate. Oomycotes include a large number of pathogenic organisms. Phytophthora infestans have played a famous role in human history.

42. **What is Mantle?** (MLN. GH, SWL. 2019)

Ans. Mantle: The body is covered by a glandular epithelial envelope called mantle which secretes calcareous shell.

43. **What are spicules?** (MLN. GH, 2019)

Ans. Spicules: Spicules are structural elements found in most sponges. They provide structural support and deter predators.

44. **Name one Zooflagellate that lives as symbiont and other as parasite causing disease.** (SGD. 2019)

Ans. Zooflagellates: Trichonymphas are complex, specialized flagellates with many flagella which live as symbionts in the gut of termites and help in the digestion of dry wood. "Trypanosoma" is a human parasite causing African sleeping sickness.

45. **Give two examples each of Red algae and Green algae.** (RWP. 2019)

Ans. **Examples of red algae:** i. Chondrus ii. Plumaira

Examples of green algae: i. Chlorella ii. Ulva

46. **What is Phytophthora infestans?** (DGK. 2019)

Ans. Phytophthora Infestans: It was the cause of Irish potato famine of the 19th century. It causes a disease known as late blight of potatoes. Because of several rainy cool summers in Ireland the water mold multiplied unchecked causing potato tubers to rot in the fields, since potatoes were the stable of Irish peasants diet many people starved to death. The famine prompted a mass migration out of Ireland to such countries as the United States.

47. **Give habitat of Algae.** (RWP. 2019)

Ans. Habitat of Algae: Almost all algae are aquatic. When actively growing algae are restricted to damp or wet environment such as ocean fresh water, ponds, lakes and streams hot springs, polar ice, moist soil, trees and rocks.

48. **What are coral reefs?** (AJK. 2019)

Ans. Coral Reefs: Corals are formed from the secretions produced by specialized polyps are present certain coelenterates. These polyps become covered by stony cups due to hardening of their secretion.

☆ From the mouth of the stony cups a polyp can pass out. Its tentacle for the purpose of feeding and withdraw itself when not feeding.

☆ Most such coelenterates are colonial. The stony network of such coelenterates are called corals.

☆ Living polyps are found on the surface layer of corals underneath the mass are dead stony structure. The stony masses that are formed in this way are called coral reefs. The coral reefs are formed of calcium carbonates.

49. **Give features of pelomyxa palustris.** (AJK. 2019)

Ans. Pelomyxa Palustris: The giant amoeba Pelomyxa palustris may be the most primitive of all eukaryotic like form. This species has multiple membrane-bound nuclei but none of the other organelles found in all other eukaryotes. Giant amoebas inhabit mud at the bottom of fresh water ponds, where they contribute to the degradation of organic molecules.

ESSAY TYPE QUESTIONS

No Long Question has been taken from this chapter.

CHAPTER 08

Fungi (The Kingdom of Recyclers)

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. **Which of the following is major structural component of fungus cell wall?** (LHR. GI, 2016)
   (A) Cellulose (B) Peptidoglycan **(C) Chitin** (D) Liginin
2. **Deadly poisnous fungus is:** (LHR. GI, 2015)
   (A) Agaricus (B) Armillaria (C) Morchella **(D) Amanita**
3. **A single mycelium may produce upto a kilometer of new hyphae in only:** (MLN. GI, 2016)
   (A) One day (B) Five days (C) Fifteen days (D) Twenty days
4. **Example of soil dwelling carnivorous fungus is:** (GRW. GI, 2014)
   (A) Arthrobotrys (B) Armillaria (C) Pleurotus (D) Pencillium
5. **The ecologically important bio-indicator of air pollution are:** (LHR. GI, 2017)
   (A) Lichen (B) Mycorrhizae (C) Yeast (D) Viruses
6. **Most of the visible part of lichen is:** (DGK. GII, 2015) (DGK. GI, 2016) (GRW. GI, 2017)
   (A) Fungi (B) Algae (C) Bacteria (D) Roots
7. **Parasitic fungi directly absorb the nutrient from the living host cytoplasm by:** (LHR. GI, 2014)
   (A) Ascospores **(B) Conidia** (C) Zygospores (D) Basideospores
8. **Fungi can tolerate wide range of PH from:** (DGK. GII, 2016)
   (A) 3-8 (B) 4-6 **(C) 2-9** (D) 1-5
9. **The imperfect fungi are also called:** (GRW. GII, 2015)
   (A) Basidiomycetes (B) Ascomycetes **(C) Deuteromycetes** (D) Zygomycetes
10. **Fungi are heterotrophs that lack cellulose in their cell wall and contain a chemical found in external skeleton of arthropods:** (GRW. GI, 2016)
    (A) Cutin (B) Lignin (C) Pectin **(D) Chitin**
11. **The fungi which obtain their food from organic matter are called:** (RWP. GI, 2016)
    (A) Saprotrophs (B) Autotrophs (C) Heterotrophs (D) Parasites
12. **Which is absent in fungi?** (GRW. GII, 2014)
    (A) Chlorophyll (B) Hyphae (C) Glycogen (D) Chitin
13. **The closest relatives of fungi are probably:** (GRW. GII, 2016)
    (A) Animal **(B) Slime mold** (C) Brown algae (D) Vascular plants
14. **In fungi spores are produced inside the reproductive structure called:** (LHR. GI, 2016)
    (A) Conidia **(B) Sporangia** (C) Basidia (D) Ascocarps
15. **The principal decomposers of cellulose and lignin are:** (SWL. GI, 2014) (GRW. GII, 2017)
    (A) Bacteria (B) Viruses **(C) Fungi** (D) Prtozoans
16. **Despite absence of sexual reproduction, imperfect fungi show special kind of sexual reproduction called as:** (GRW. GII, 2017)
    (A) Kayogamy (B) Plasmogamy (C) Conjugation **(D) Parasexuality**
17. **Unicellular yeasts reproduce by:** (AJK. GI, 2016)
    (A) Spores (B) Binary fission **(C) Budding** (D) Fragmentation

18. **One of the following reproductive cells structures are asexual:** (SGD. GI, 2016)
(A) Basidiospores (B) Conidia (C) Ascospores (D) Zygospores

19. **Oyster mushroom is considered as:** (RWP. 2010)
(A) Parasitic fungi (B) Saprotrophic fungi
(C) Carnivorous fungi (D) Mycorrhizal fungi

20. **Asexual reproduction in yeast occurs by:** (RWP. GI, 2016)
(A) Conidia (B) Fragmentation (C) Budding (D) Resting spores

21. **Agaricus are:** (RWP. 2017)
(A) Poisnous fungi (B) Edible fungi (C) Pathogenic fungi (D) Parasitic fungi

22. **Each Ascus comprise Ascospores:** (DGK. GI, 2015)
(A) 04 (B) 08 (C) 12 (D) 03

23. **________ is the largest group of fungi.** (GRW. GI, 2015)
(A) Basidiomycota (B) Zygomycota
(C) Ascomycota (D) Deuteromycota

24. **Symbiotic association between fungi and algae is called:** (FBD. GI, 2017)
(A) Predator (B) Parasite (C) Autotroph (D) Lichens

25. **Penicillium belongs to:** (FBD. GII, 2017)
(A) Basidiomycetes (B) Deuteromycetes
(C) Ascomycetes (D) Zygomycetes

26. **Members of Basidiomycota are commonly called:** (SGD. GII, 2015)
(A) Splitting fungi (B) Morels (C) Mushrooms (D) Molds

27. **The most common rust fungi are:** (LHR. GI, 2015) (RWP. 2018)
(A) Ustilago (B) Puccinia (C) Penicillium (D) Yeast

28. **Ecological role of fungi as decomposer is parallel only by:** (FBD. GI, 2016)
(A) Arthropoda (B) Bacteria (C) Algae (D) Bryophytes

29. **Ustilago species is most common:** (FBD. GII, 2016) (MLN. GI, 2019)
(A) Rust Fungi (B) Smut fungi (C) Yeast (D) Mold

30. **Alternaria is an example of:** (GRW. GI, 2014)
(A) Zygomycota (B) Ascomycota (C) Basidiomycota (D) Deuteromycota

31. **Saccharomyces cerevisiae is the most exploited:** (MLN. GI, 2014) (SWL. 2018)
(A) Rust (B) Brown mold (C) Green mold (D) Yeast

32. **The group of fungi in which sexual reproduction has not been observed:** (SGD. GI, 2014) (GRW. GI, 2015) (AJK, 2019)
(A) Deuteromycota (B) Zygomycota
(C) Ascomycota (d) Basidiomycota

33. **The skeleton of arthropoda is made of:** (MLN. GI, 2015) (AJK. 2018)
(A) Cellulose (B) Chitin (C) Polysaccharide (D) Lignin

34. **Rhizoups belong to which of the following groups:** (MLN. GII, 2014) (LHR. GI, 2017)
(A) Ascomycota (B) Deuteromycota (C) Zygomycota (D) Basidiomycota

35. **Brush like arrangement of its conidia is charateristic of:** (SWL. GI, 2016)
(A) Rhizopues (B) Penicillium (C) Ustilago (D) Agaricus

36. **Which of the following does not produce conidia?** (BWP. GII, 2015)
(A) Zygomycota (B) Deuteromycota (C) Ascomycota (D) None of these

37. **Yeasts are unicellular:** (DGK. GI, 2017)
(A) Protozoans (B) Algae (C) Fungi (D) Bacteria

38. **Loose smut of wheat is caused by the following fungi:** (SWL. GII, 2017) (LHR. GII, 2019)
(A) Puccinia (B) Penicillium (C) Aspergillus **(D)** Ustilage

39. **Which one of the following fungus is non-edible:** (BWP. GII, 2014)
(A) Mushrooms (B) Morels **(C)** Toad Stools (D) Truffles

40. **Poisonous mushrooms are called:** (LHR. GII, SGD. GI, 2015) (AJK. GI, 2017) (BWP. 2019)
(A) Truffles (B) Morels **(C)** Toad Stools (D) Agaricus

41. **One example of Fruticose lichens is:** (DGK. GI, 2014)
(A) Parmelia (B) Basidia (C) Lecanor **(D)** Ramalina

42. **Which is used to give flavor, aroma and characteristic colour to the cheese?** (LHR. GI, 2014)
(A) Penicillium (B) Aspergillus (C) Yeast (D) Neurospora

43. **First discovered antibiotic is:** (FBD. GI, 2018)
(A) Lovastatin (B) Cyclosporine **(C)** Penicillin (D) Ergotine

44. **The number of edible mushroom species are about:** (BWP. GI, 2017) (FBD. GII, 2019)
(A) 100 **(B)** 200 (C) 300 (D) 400

45. **Citric acid is obtained from:** (MLN. GI, 2017)
(A) Penicillium **(B)** Aspergillus (C) Sacchromyces (D) Neurospora

46. **The disease caused by a fungus is:** (BWP. GI, 2017)
(A) Ring worm (B) Tetanus (C) Polio (D) Small pox

47. **Which of the following is not symptom of Ergotism?** (MLN. GI, 2014)
(A) Convulsion (B) Psychotic Delusion
(C) Gangrene **(D)** Indigestion

48. **Parasitic fungi directly absorb nutrients from living host by:** (LHR. GI, 2018)
(A) Haustoria (B) Roots (C) Rhizoids (D) Gametangia

49. **All fungal nuclei are haploid except for transient diploid :** (LHR. GII, 2018)
(A) Spores (B) Zygote (C) Conidia **(D)** Zygospores

50. **Histoplasmosis caused by spores of fungus is a serious infection of:** (FBD. 2018)
(A) Kidney (B) Skin **(C)** Lungs (D) Heart

51. **The cell wall of fungus contains:** (MLN. GII, 2018)
(A) Cellulose **(B)** Chitin (C) Calcium carbonate (D) None of these

52. **Reindeer moss used as food for reindeer is:** (DGK. GI, 2018)
(A) Moss **(B)** Lichen (C) Mold (D) Club fungi

53. **pH of fresh saliva is nearly:** (FBD. GII, 2019)
(A) 6 (B) 7 **(C)** 8 (D) 9

54. **Cell wall of oomycotes contain mostly:** (FBD. GII, 2019)
(A) Chitin **(B)** Cellulose (C) Glycan (D) Pectin

55. **Rhizopus belongs to class:** (MLN. GII, 2019)
(A) Deuteromycetes (B) Ascomycetes (C) Basidiomycetes **(D)** Zygomycetes

56. **80% food of sponges consists of:** (SWL. 2019)
(A) detrital organic matter (B) algae
(C) phytoplankton (D) zooplankton

57. **Candida albicans is a:** (SWL. 2019)
(A) Smut (B) Rust **(C)** Yeast (D) Morel

58. **Some fungi are used to control environmental pollution, the process is called** (SGD. 2019)
(A) Biological control (B) Fungal culture
(C) Bioremediation (D) Hydroponic

SHORT ANSWER QUESTIONS

1. **Name, methods of asexual reproduction in Fungi.** (LHR. GI, 2014) (BWP. GI, 2016)

Ans. Fungi can reproduce asexually by following methods.

i. By means of budding ii. By conidia formation
iii. By spore formation iv. By fragmentation

2. **What is nuclear mitosis?** (LHR. GI, MLN. GI, SWL. GI, 2014) (LHR. GII, 2016) (DGK. GII, 2017) (GRW. FBD. GII, MLN. GII, AJK. 2019)

Ans. **Nuclear Mitosis:** Fungi shows a characteristic type of mitosis called nuclear mitosis in which nuclear envelop does not break instead the mitotic spindle forms within the nucleus and the nuclear membrane constricts between the two clusters of daughter chromosomes.

3. **Write resemblances of fungi with plants.** (FBD. GI, 2017) (FBD. GI, 2019)

Ans. **Resemblances of fungi with Plants:**

Fungi show following resemblances with the plants:

i. Both have cell wall ii. Both lack centrioles iii. Both are non-motile

4. **Name asexual and sexual spores of ascomycetes.** (LHR. GII, 2016)

Ans. The name of asexual spores of ascomycetes is conidia (sing: Conidium). The name of sexual spores of ascomycetes is ascospores.

5. **What is the major compoment of cell wall of fungi?** (FBD. GI, 2014)

Ans. The major component of cell wall of fungi is chitin.

6. **Define hyphae. Give their two types.** (SWL. GI, 2014) (LHR. GII, 2015) (GRW. GII, 2016) (LHR. GII, 2017)

Ans. **Hyphae:** The body of fungus consists of long slender, branched tubular thread like filaments called the hyphae.

Types: There are two types of hyphae:

i. Septate Hyphae: Septate hyphae are divided by crosswalls called septa into individual cells containing one or more nuclei.

ii. Non Septate Hyphae: Non septate hyphae lack septa and are not divided into individual cells, instead these are in the form of an elongated multinucleated large cells. That's why non septate hyphae are also called coenocytic hyphae.

7. **Differentiate between Lichens and Mycorrhizae.** (LHR. GI, 2016)

Ans.

Lichens	Mycorrhizae
Lichens are mutualistic or symbiotic associations between certain fungi and some photoautotrophs.	Mycorrhizae are mutualistic associations between certain fungi and roots of vascular plants (about 95% of all kinds of vascular plants).

8. **How Yeast Differ With Other Fungi?** (MLN. GI, 2015)

Ans. **characteristics of yeast:**

i. Yeast are non hyphal unicellular fungi. ii. Yeast reproduce by budding.
iii. Yeast are involved in fermentation process.

9. **Explain what is fungus?** (GRW. GI, 2014)

Ans. **Fungus:** Fungus is a heterotrophic, eukaryotic, multicellular organism having absorptive mode of nutrition.

10. **What are lichens?** (GRW. GI & GII, RWP. GI, 2015) (LHR. GII, RWP. GI, DGK. GI, BWP. GI, 2016) (MLN. GI & GII, 2017) (SGD. 2018) (MLN. GI, 2019)

Ans. **Lichens:** Lichens are mutualistic symbiotic association between fungi and algae. Most of the visible part of lichen consist of fungus and algal components are present within the hyphae.

Role of fungi and algae in lichen: Fungus protects the algal partner from strong light and desiccation and itself gets food through the courtesy of alga.

Ecological importance of lichen:

i. Lichen can grow at harsh places such as bare rock.

ii. Lichens are ecologically very important as bioindicators of air pollution.

11. What is mycorrhiza? Give its types. (SGD. GI, DGK. GI, 2015) (GRW. GII, 2016) (SWL. GI, 2017) (LHR. GI, 2018)

Ans. Mycorrhizae: Mycorrhizae are mutualistic association between certain fungi and roots of vascular plants.

Types: There are two main types of mycorrhizae:

i. Endomycorrhizae   ii. Ectomycorrhizae

Importance of Mycorrhizae for plants: The fungal hyphae increase the amount of soil contact and total surface area for absorption specifically of phosphorus, zinc, copper and other nutrients from the soil into the roots. Such plants show better growth than those without this association. The plant, on the other hand, Supplies organic carbon to fungal hyphae.

12. Define plasmogamy. (MLN. GI, 2015)

Ans. Plasmogamy: Fusion of cytoplasm is known as plasmogamy. When fungi reproduce sexually, hyphae of two genetically different types come together their cytoplasm fuse followed by nuclear fusion.

13. Define endomycorrhizae and ectomycorrhizae. (BWP. GI, 2015) (MLN. GI, 2016) (SGD. 2018) (MLN. GII, 2019)

Ans. Endomycorrhizae and Ectomycorrhizae are two main types of mycorrhizae.

i. Endomycorrhizae: Mycorrhizae in which the fungal hyphae penetrate the outer cells of the plants root, forming coils, swellings and minute branches and also extend out into surrounding soil is known as endomycorrhizae.

ii. Ectomycorrhizae: Mycorrhizae in which the fungal hyphae surround and extend between the cells but do not penetrate the cells walls of the roots also extend out into surrounding soil is known as ectomycorrhizae.

Root cells of plants (cross-section)
Ectomycorrhizae
Endomycorrhizae

14. What are carnivores fungi? Give one example. (SGD. GI, 2016)

Ans. Carnivores Fungi: Carnivores fungi are active predators. The oyster mushroom paralyses the nematodes, penetrate them, and absorb their nutritional contents, primarily to fulfill its nitrogen requirements. It fulfills its glucose requirements by breaking the wood.

Example: Oyster mushroom (Pleurotus ostreatus)

15. Give features of zygomycota.

Ans. Features of zygomycota: (MLN. GII, 2015)

i. During their sexual reproduction, zygote formed directly by the fusion of hyphae.

ii. Zygote forms temporary, dormant, thick walled resistant structure called zygospore, hence the name zygomycetes.

iii. Meiosis takes place when zygospore germinates and haploid spores are produced.

iv. Spores on germination produce new mycelium. Asexual reproduction by spores is common.

v. Hyphae are coenocytic.

vi. Rhizopus, found growing on and spoiling moist bread, fruit ect.

16. Compare ascus with a basidium. (MLN. GI, 2015) (LHR. GII, 2018)

Ans.

Ascus	Basidium
i. It is sac like, microscopic reproductive structure produced during sexual reproduction within which sexual spores are produced.	i. It is club-like (Latin term for small pedestal), microscopic reproductive structure on which sexual spores are produced.
ii. It is formed by members of ascomycota class of fungi.	ii. It is formed by members of Basidiomycota class of fungi.

17. What are conidia? (FBD. GI, 2014)

Ans. Conidia: Conidia are non-motile, asexual spores which are cut off at the end of modified hyphae called conidiophores usually in chains or clusters. They may be produce in very large number, can survive for weeks and cause rapid colonization of new food.

18. Why are basidiomycetes called club fungi? (MLN. GI, 2015)

Ans. Basidiomycetes are named so for their characteristics, club-shaped (hence also called club fungi) sexual reproductive structure, the basidium.

19. Differentiate between rusts and smuts. (FBD. GI, MLN. GI, BWP. GI, 2014) (SGD. GII, 2015) (FBD. GI, 2016) (FBD. MLN. GII, DGK. GI, BWP. AJK, 2018) (LHR. GII, 2019)

Ans.

Rusts	Smuts
Rusts are called so because of numerous rusty, orange-yellow coloured disease spots on their host surface (mostly stem, leaves), later revealing brick / rust red spores of the fungus. **Example:** Puccinia species are most common rust fungi.	Smuts are called so because of their black, dusty spore masses that resemble soot or smut; these spore masses replace the grain kernels such as those of wheat, corn etc. **Example:** Ustilago species are most common smut fungi.

20. Why are toadstool called death angel? (MLN. GII, 2017)

Ans. Toadstools are poisonous mushrooms. They contain poisonous alkoloids that affect the human nervous system, sometimes with fatal results if they are consumed. So they are called death angel.

21. Name and explain one mutualistic symbiotic association. (BWP. GI, 2014)

Ans. Lichens are mutualistic or symbiotic associations between certain fungi and some photoautotrophs. The fungi involved in lichens are mostly ascomycetes and imperfect fungi, and few basidiomycetes while photoautotrophs include either green algae or a cyanobacterium or sometimes both.

Most of the visible part of lichen consists of fungus, whereas algal components are present within the hypae. Fungus protects the algal partner from strong light and desiccation and itself gets food prepared by alga.

Lichens are commonly found on bare rocks and trunks of trees. They also hang from trees in wet forests. Lichens vary in colour, shape, overall appearance and growth form. They are ecologically very important as bio-indicators of air pollution.

22. How Budding differ from fragmentation? (DGK. GI. 2016) (MLN. GI. 2017) (LHR. GI. 2015)

Ans.

Fragmentation	Budding
Fragmentation is a simple breakdown of mycelium of some hyphal fungi, each broken fragment giving rise to a new mycelium.	Budding as an asymmetric division in which tiny outgrowth or bud is produced which may separate and grow or by simple relatively equal cell division. Example: Unicellular yeast reproduce by budding

23. What are dikaryotic hyphae? (FBD. GI. 2014)

Ans. Dikaryotic hyphae: The septate hyphae having two nuclei per cell are called dikaryotic hyphae.

24. Name some edible fungi. (GRW. GI. 2017)

Ans. Names of edible fungi:

i. Morchella esculenta (morel)
ii. Tuber species (Truffles)
iii. Agaricus species (Mushroom)

25. How spore differ from conidia? (AJK. GI. 2016) (LHR. GI. SWL. GI. 2017) (SWL. 2018)

Ans.

Spores	Conidia
i. Spore are produced inside the reproductive structure called sporangia which are cut off from the hyphae by complete septa.	i. Conidia are non-motile, asexual spores which are cut off at the end of modified hyphae called conidiophores, and not inside the sporangia, usually in chains or clusters.
ii. Spores may be produced by sexual or asexual process, are haploid, non motile and not require water for their dispersal, and are produced in very large number.	ii. These may be produced in large number, can survive for weeks and cause rapid colonization of new food.

26. Compare Ascocarp with Basidiocarp. (SGD. GI. 2016)

Ans.

Ascocarp	Basidiocarp
i. Ascocarp is a fruiting body in Ascomycetes.	i. Basidiocarp is a fruiting body in basidiomycetes.
ii. In ascocarp, asci (singular-Ascus) are present which are sac like structure in which ascospores are produced by meiosis.	ii. In basidiocarp, basidia (singular-basidium) are present which are club shaped structure in which basidiospores are produced by meiosis.
iii. Upto eight (8) haploid sexual spores called ascospores are produced within an ascus.	iii. Four (4) haploid sexual spores called basidiospores are born externally at the end of basidium on slender position.

27. Why are some fungi called as predators? (RWP. GII. DGK. GI. 2017)

Ans. Fungi as predators: Some fungi for example, oyster Mushroom are called predators because they prey the animals such as nematodes, paralyse them and penetrate them. Then they absorb their nutritional contents, primarily to fulfil their nitrogen requirements.

28. Name the type of hypha and sexual spore in sac fungi. (LHR. GII. 2016)

Ans. Type of hypha in sac fungi: Sac fungi have septate hypha with lengthy dikaryotic phase.

Type of Sexual spores in sac fungi: Sac fungi produce Ascospores within ascus of ascocorp by meiosis.

29. Write down the sexual reproduction of mushrooms. (DGK. GII, 2015)

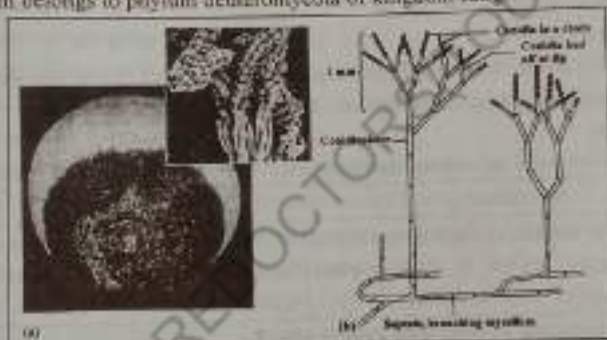
Ans. Sexual Reproduction of Mushrooms: Mushrooms belong to phylum Basadiomycota of Kingdom Fungi. Mushrooms reproduce sexually by basidiospores produced in sexual reproductive structure, the basidium. Nuclear fusion in the basidium is followed by meiosis. Four haploid sexual spores are born on each basidium. Their characteristic fruiting bodies (basidium) or visible mushrooms are formed entirely of dikaryotic mycelium.

30. What do you mean by budding and parasexuality? (RWP. GI, 2014) (LHR. GII, MLN. GI, AJK. GI, 2015) (GRW. GI, 2016) (DGK. GI, 2017) (LHR. GI, FSD, RWP. 2018) (GRW. SWL. 2019)

Ans. Parasexuality: Parasexuality is a special kind of genetic recombination in imperfect fungi in which portions of chromosomes of two nuclei lying in the same hypha are exchanged.

Budding: Budding is an asymmetric division in which tiny outgrow or bud is produced which may separate or grow or by simple relatively equal cell division. Unicellular yeasts reproduce by budding.

31. Sketch structure of penicillium. (DGK. GII, 2014) (DGK. GII, 2015)

Ans. Penicillium belongs to phylum deuteromycota of kingdom fungi.

32. How penicillium reproduce? (SGD. GI, 2014)

Ans. Reproduction in Penicillium: Penicillium reproduces asexually by means of naked spores called conidia. These are found in chain at the tips of special hyphae called conidiophores. Brush-like arrangement of its conidia is characteristic of penicillium. These conidia give colour to the mycelia colony, which is circular. Mature conidia are easily and readily dispersed.

33. Give the importance of pink bread mold in food industry and genetics. (SGD. GI, 2016)

Ans. Importance of Pink Bread Mold:

i. Pink bread mold Neurospora has been used for genetic research.
ii. Pink bread mold are used in the production of bread and liquor.

34. What are toad stools? Give example. (GRW. GII, 2014) (GRW. GII, 2015) (LHR. GII, RWP. 2018)

Ans. Toad Stools: Toad stools are poisonous mushrooms.

Examples: i. Amanita commonly known as death cap/death angel.
ii. Jack-O' latern (whose gills glow in the dark).

35. Write down importance of yeast. (GRW. GI, 2015)

Ans. Importance of Yeast:

i. Yeasts are used in molecular biological research of their rapid generation and rapidly increasing pool of genetic and biochemical information.

ii. Yeast were the first eukaryotes to be used by genetic engineers to make a functional artificial chromosome.
iii. Yeasts are also being investigated for production of some hormones.
iv. Yeasts are important because of their fermenting ability. (SGD. GII, 2016)

36. Write any two superficial infections caused by fungi.

Ans. Superficial fungal infections:
i. Ringworm ii. Athlete's foot (AJK. GI, 2016)

37. Give names of two Plants and Animals diseases caused by Fungi.

Ans. Plants fungal Diseases:
i. Powdery mildews ii. Ergot of rye

Animals fungal Diseases:
i. Ringworm ii. Athlete's foot (RWP. GI, 2017) (RWP. 2018)

38. What are Aflatoxins?

Ans. Aflatoxins: Aflatoxins is a mycotoxin, i.e. a toxin produced by fungi Aspergillus flavus. Aflatoxins are carcinogenic (cancer causing). Aspergillus contaminates improperly stored grains like peanuts and corn etc. milk egg and meat. These infected things may have some traces of aflatoxins. (MLN. GI, 2016)

39. What is Ringworm?

Ans. Ringworm: Ringworm is a superficial fungal infection related to skin disease.
Cause of Ringworm: Ringworm is caused by certain imperfect fungi.
i. Ergotism ii. Aspergillosis

40. Differentiate between mycelium and hyphae. (GRW. DGK. GI, 2018)

Ans.

Mycelium	Hyphae
The body of a fungus is called mycelium (except yeasts which is non-hyphal unicellular fungi).	Hyphae is a long, slenderer, branched, tubular, thread like filaments of which mycelium is composed of.

41. Differentiate between conidia and conidiophore. (GRW. 2018)

Ans.

Conidia	Conidiophore
Conidia (Singular Conidium) are non-motile, asexual spores.	Conidiophore is the tip of modified hyphae.

42. Differentiate between sporangia and conidia. (DGK. GII, 2018)

Ans.

Sporangia	Conidia
Sporangia are the reproductive structures in which spores are produced.	They are non-motile, asexual spores which are formed at the tips of modified hypae called conidiophores.

43. To which phyla yeasts belong? How do they differ from other fungi? (AJK. 2018)

Ans. Yeasts are unicellular microscopic fungi, derived from all the three different groups of fungi but mostly *Ascomycetes*, and reproducing mostly asexually by budding. However, yeasts reproduce sexually by forming asci / ascospores or basidia / basidiospores. They ferment carbohydrates (glucose) to ethanol and carbon dioxide. They are non-hyphal.

44. Why slime molds are included in kingdom protoctista? (LHR. GI, 2019)

Ans. Slime molds have unusual morphology. Hence they are placed in kingdom Protista. Some stages of their life cycle exhibit Protistan characteristics while some other stages exhibit fungal characteristics.

i. Slime mold lack chitin in their cell walls. Hence they are not fungi.

ii. Slime molds have a single yellow blob with many nuclei. This characteristic feature of plasmodium.

iii. Spores produced in slime molds have cellulose in their cell walls which is not present in fungal cell walls.

45. What are rust and smut diseases of plants? (FBD. GI, 2019)

Ans. Rust and Smut Disease: Rust are called so because of numerous rusty orange yellow colored disease spots on their host surface later revealing brick / rust spores of the fungus. Smuts are called so because of their black dusty spore masses that resemble soot or smut these spore masses replace the grain kernels such as those of wheat corn.

46. Write the scientific name of yeast. (FBD. GII, 2019)

Ans. Scientific name of yeast is "Saccharomyces Cerevisiae"

47. What is radula? (FBD. GII, SWL. 2019)

Ans. Radula: The space between the shell and mantle cavity contains gills in some animal. In the mouth cavity of many molluscs there is a rasping tongue like radula provided with many horny teeth.

48. Define dikaryotic phase with examples. (MLN. GI, 2019)

Ans. Dikaryotic Phase: A fungal hyphae having two nuclei of different genetic types is called dikaryotic hyphae. When karyogamy does not take place immediately after plasmogamy it forms dikaryotic hyphae.

Example: Hyphae of Ascomycetes and Basidiomycetes

49. What is hypha? How unseptate hyphae are advantageous? (SGD. 2019

Ans. Hypha: The body of a fungus called mycelium, consists of long slender, branched tubula thread like filaments called Hyphae. (Singular hypha)

Advantage: They are in the form of enlongated multi-nucleated large cell such hypha ar coenocytic hyphae in which cytoplasm moves effectively distributing the materia through-out the cell.

50. How composition of fungus cell wall is advantageous to fungi? (SGD. 201

Ans. Composition: Fungi cell wall is made up of chitin while plants made up of cellulose chiti is more resistant than cellulose due to which it can degrade the other walls.

51. Define mycorrhizae. What is its effect on its partner? (DGK. 201

Ans. Mycorrhizae: Mycorrhizae are mutualistic association between certain fungi and roots vascular plants (about 95% of all kinds of vascular plants).

The fungal hyphae increase the amount of soil contact and total surface area for absorpti and help in the direct absorption of phosphorus, zinc, copper and other nutrients from t soil into the roots. Such plants show better growth than those without this association.

52. What are zygomycetes? Why they are named so? (MLN. GII, 2016) (DGK. 20

Ans. Zygomycetes: During their sexual reproduction, zygote formed directly by the fusion hyphae forms temporary, dormant thick walled resistant structure called zygospore hen the name zygomycetes.

53. Why fungus like protists are not fungi? (DGK. 2

Ans. Fungus like protists are not fungi for several reason. Many of these protist have centri and produce cellulose as a major component of their cell walls, whereas fungi l centrioles and have cell walls of chitin.

54. Differentiate between septate and coenocytic hyphae. (RWP, AJK, 2019)

Ans. Differences between septate and coenocytic hyphae:

Septate	Non-Septate
i. Septate hyphae are divided by cross-wall called septa into individual cells containing one or more nuclei.	i. Non-septate hyphae lack septa and are not divided into individual cells.
ii. Septa of many septate fungi have a pore through which cytoplasm flows from cell to cell carrying the material to growing tips and enabling the hyphae to grow rapidly when food and water are abundant and temperature favourable.	ii. These are in the form of elongated multi-nucleated large cell called coenocytic hyphae in which cytoplasm moves effectively distributing the material through-out the cell.

ESSAY TYPE QUESTIONS

Q1. Discuss taxonomic status of fungi. (GRW, GI, RWP, GI, 2014) (LHR, GI, GRW, GII, 2015) (AJK, 2018)

Q2. Give the different modes of nutrition in Fungi. (SWL, GI, 2016) (RWP, 2019)

Q3. What do you know about mutualistic nutrition in Fungi? (LHR, GII, 2016)

Q4. Write a detailed note on mycorrhizae. (RWP, GI, 2015)

Q5. Give a brief account of fungi with reference to lichens and predators. (FBD, GI, 2017)

Q6. How asexual reproduction occurs in fungi. (FBD, GI, SGD, GI, 2015) (DGK, GI, RWP, GI, 2016)

Q7. Discuss different methods of asexual reproduction in fungi. (FBD, GI, 2015) (LHR, GI, 2016) (LHR, GI, RWP, GI, DGK, GII, 2017)

Q8. Describe and draw life cycle of Rhizopus. (DGK, GI, 2015) (SWL, GI, 2017) (GRW, SGD, 2018)

Q9. Give an account of Ascomycotes. (MLN, GI, 2016) (DGK, GI, 2017) (LHR, GII, DGK, GII, 2018) (SGD, 2019)

Q10. Characterize Basidiomycota (MLN, GI, 2014) (MLN, GI, 2017) (MLN, GII, 2019)

Q11. Give the disease cycle of loose smut of wheat caused by Ustilago tritici. (No Need of Diagram). (SGD, GII, 2015)

Q12. Write a note on economic gains due to fungi. (SWL, GI, SGD, GI, 2014) (GRW, GI, DGK, GII, AJK, GI, 2015) (GRW, GI, SGD, GI, DGK, GII, 2016) (LHR, GII, GRW, GI, MLN, GI, 2017) (FBD, 2018) (GRW, FBD, GII, 2019)

Q13. Write down economic losses due to fungi. (LHR, GI, RWP, DGK, GI, RWP, 2018)

Q14. Discuss mutualistic symbiotic association of fungi. (MLN, GI, 2018)

Q15. Why taxonomic status of fungi has changed from that of a group of plant kingdom to a separate kingdom "Fungi"? (MLN, GII, 2018)

Q16. What are different methods of sexual reproduction in fungi? (SWL, 2019)

Q17. Describe, giving examples, different ways in which fungi are useful to human. (LHR, GII, 2019)

CHAPTER 09

Kingdom Plantae

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. **The period in which first complete seed plant appeared is:** (LHR. GI. 2014)
   (A) Devonian (B) Permian (C) silurian (D) Carboniferous
2. **Vascular plants are:** (LHR. GII. 2014)
   (A) Bryophytes (B) Embryophytes (C) Tracheophytes (D) None of these
3. **The bilogical name of Amaltas is:** (LHR. GII. 2015)
   (A) Cassia senna (B) Bauhinia variegata
   (C) Cassia fistula (D) None of these
4. **The bryophytes are non-vascular plants:** (LHR. GI. 2016)
   (A) Flowering (B) Flowerless plants
   (C) Gametophytic plants (D) Sporophytic plants
5. **Vascular system is absent in:** (RWP. GI. 2016)
   (A) Bryophytes (B) Pteridophytes (C) Gymnosperms (D) Angiosperms
6. **The fruit of leguminosae:** (LHR. GI. 2017)
   (A) Legume (B) Pod (C) Caryopsis (D) Berry
7. **In spermatophytes, seed is formed from:** (LHR. GII. 2017)
   (A) Ovary (B) Ovule (C) Anther (D) Embryo sac
8. **Which one of the following is not extinct?** (LHR. GI. 2014) (RWP. GI. 2017)
   (A) Horneophyton (B) Psilotum (C) Psilophyton (D) Cooksonia
9. **Amphibious plants belong to group:** (MLN. GI. 2016)
   (A) Angiospermae (B) Bryophytes (C) Pteridophyta (D) Filicinae
10. **Microspores of seed plants that contain microgametophyte including gametes is called:** (LHR. GI. 2014)
    (A) seed (B) Ovule (C) Pollen grain (D) Flower
11. **Heterospory is the production of two types of:** (GRW. GI. 2015)
    (A) Gametes (B) spores (C) Sperms (D) Eggs
12. **The male gametophyte of angiosperm is:** (GRW. GI. 2016)
    (A) anther (B) Microspore
    (C) Germinated pollen grain (D) Megaspore
13. **A haploid spermatozoid (antherozoid) fuses with the haploid egg of oosphere to produce:** (GRW. GII. 2015)
    (A) Haploid oospore (B) zygote (C) Diploid oospore (D) Both b and c
14. **In mosses, archegonia and antheridia mixed with sterile hairs are called:** (SWL. GII. 2017)
    (A) Mycelium (B) Paraphyses (C) Hyphae (D) Trichomes
15. **Megaspore within megasporangium develops into:** (GRW. GI. 2014)
    (A) Ovule (B) Fruit (C) Ovary (D) Embryo sac
16. **Fern Prothallus is:** (GRW. GII. 2014) (RWP. 2019)
    (A) sporophyte (B) Saprophyte (C) Gametophyte (D) Seed

(GRW. GI, 2017)

17. **Sugar is obtained from the juice of:**
    (A) Oryza sativa (B) Hordium vulgare
    (C) Sorghum vulgare **(D)** Saccharum officinarum
    (GRW. GI, 2014)
18. **Which one belongs to Bryopsida?**
    (A) Marchentia (B) Porella (C) Anthoceros **(D)** Polytrichum
    (MLN. GI, 2017)
19. **________ plants are said to be amphibian's of plants.**
    (A) Angiosperm (B) Gymnosperm **(C)** Bryophytes (D) Pteridophyte
    (RWP. GII, 2014)
20. **Bryophytes are generally thought to have evolved from:**
    (A) Brown algae (B) Red algae **(C)** Green algae (D) Golden algae
    (RWP. GI, 2015) (MLN. GI, 2019)
21. **The simplest of all bryophytes are:**
    (A) Mosses (B) Hornworts **(C)** Liverworts (D) Whisk ferns
22. **The system of classification which reflects the natural relationship among living organisms and their mode of origin is:** (SGD. GI, 2014)
    (A) Natural **(B)** Phylogenetic (C) Artificial (D) Modern
    (DGK. GI, 2017)
23. **The sporophyte of bryophytes is:**
    (A) Haploid **(B)** Diploid (C) Triploid (D) Tetraploid
    (GRW. GI, 2014)
24. **Which one is an example of non-vascular plants?**
    (A) Rhynia (B) Psilotum (C) Adiantum **(D)** Marchantia
    (SGD. GII, 2014)
25. **Marchantia is an example of:**
    (A) Bryopsida (B) Lycopsida **(C)** Hepaticopsida (D) Anthoceropsida
    (FBD. GI, 2014)
26. **Flowering plants belong to the class:**
    (A) Angiospermae (B) Gymnospermae (C) Filicineae (D) None of these
    (FBD. GI, 2015)
27. **Mosses are:**
    (A) Arthrophytes (B) Spermatophytes **(C)** Bryophytes (D) Tracheophytes
28. **Rootless sporophyte is found in:** (FBD. GII, 2014) (AJK. 2019)
    (A) Psilopsida (B) Lycopsida (C) Sphenopsida (D) Pteropsida
29. **A haploid spermatozoid fuses with haploid egg to produce diploid:** (GRW. GI, 2016)
    (A) oospore (B) oosphere (C) spore (D) gamete
30. **Tracheophyta is further subdivided into:** (LHR. GI, GRW. GI, 2014)
    (A) 02 Subdivisions (B) 03 Subdivisions
    (C) 04 Subdivisions (D) 07 Subdivisions
31. **The plants that have no vascular system, gametophyte dominant, sporophyte attached to gametophytes are known as:**
    (MLN. GI, 2014)
    (A) tracheophytes **(B)** Bryophytes (C) Gametophyte (D) Sporophyte
32. **The part of flower which develops into fruit is:**
    (A) Seed (B) Flower **(C)** Overy wall (D) Ovule wall
    (FBD. GII, 2016)
33. **The megasporophylls bearing ovules are not folded and joined at the margins to form an ovary:**
    (MLN. GII, 2014)
    (A) Filicineae (B) Monocotyledonae
    (C) Dichotyledonae **(D)** gymnospermae
34. **In Anthoceros's sporophyte at the junction of foot and spore producing region, there is a band of:**
    (A) Paraphysis **(B)** Meristematic tissue (C) Phloem (D) xylem
    (MLN. GI, 2015)
35. **The reproductive organ of sporophyte is:**
    (A) Sporangium (B) Sparangium (C) Anthridium (D) Archegonium
    (MLN. GII, 2015)

36. **A heterosporous plant is one that:** (MLN. GI, 2014)
(A) Produces a gametophyte that bears both sex organs
(B) Produces Microspores and Megaspores in separate sporangia giving rise to separate Male and Female Gametophytes
(C) Is seedless vascular plant
(D) Produces two kinds of spores one sexually by mitosis and one type by meiosis

37. **In lycopsids, the arrangement of leaves is:** (SGD. GI, 2015)
(A) Spiral (B) Alternate (C) Opposite (D) All above

38. **In ________, the sporophyte has stomata and chloroplasts in the epidermis and can thus photosynthesize its own food.** (MLN. GII, 2015)
(A) Hepaticopsida (B) Anthoceropsida (C) Bryopsida (D) All bryophytes

39. **Fern gametophyte is found in/on:** (SGD. GI, 2016)
(A) Soil (B) Saprophyte (C) Sorus (D) Rhizome

40. **Strobilus is the reproductive structure of:** (BWP. GI, 2016)
(A) Selaginella (B) Equisetum (C) Psilotum (D) Rhynia

41. **The plant of sphenopsida is also called as:** (FBD. GI, 2017) (MLN. GII, 2018)
(A) Angiosperms (B) Gymnosperms (C) Mosses (D) Arthrophytes

42. **Small leaves having a single undivided vein are called:** (LHR. GI, 2016)
(A) Microphylls (B) Megaphylls (C) Neutrophylls (D) Heterophylls

43. **A flower is modified:** (BWP. GI, 2015)
(A) Stem (B) Shoot (C) Leaf (D) Root

44. **Technically a seed may be defined as a fertilized:** (AJK. GI, 2015)
(A) Egg (B) Oospore (C) Ovule (D) Both A & C

45. **The gametophyte of mosses is:** (DGK. GII, 2014)
(A) Diploid (B) Haploid (C) Polyploid (D) Tetrapoda

46. **After fertilization ________ is changed into a seed.** (LHR. GI, 2017)
(A) Fruit (B) Flower (C) Ovule (D) Ovary

47. **Which of the following is a modified leaf?** (GRW. GI, 2015)
(A) Tendril (B) Thorn (C) Flower (D) Both B and C

48. **Name the class that contains seedless plants:** (AJK. GI, 2014)
(A) Angiospermae (B) Paraphysis (C) Gymnosperm (D) Filicinae

49. **Female gametophyte in flowering plants is:** (DGK. GII, 2015)
(A) Ovary (B) Archegonium (C) Seed (D) Embryo sac

50. **The part of flower which develops into fruit is:** (SWL. GI, 2014)
(A) Flower (B) Seed (C) Ovule wall (D) Ovary

51. **Double Fertilization is a special process found in:** (MLN. GI, 2014) (LHR. GII, 2015) (DGK. GI, 2016) (GRW. FBD. 2018) (GRW. 2019)
(A) Ferns (B) Bryophytes (C) Gymnosperm (D) Angiosperms

52. **In flowering plant, ovary wall develops into:** (BWP. GI, 2017)
(A) Seed (B) Fruit (C) Flower (D) Seed coat

53. **Nectar:** (AJK. GII, 2016)
(A) Provides nourishment to the plants (B) Kills germs
(C) Attracts pollinators (D) Is sweet

54. **Pollen grain develops from haploid microspores then later develops into sperm bearing:** (AJK. GII, 2017)
(A) Gametophyte (B) Sporophyte (C) Megaspore (D) Pollen sac

55. **Ratti is formed from seeds of a plant that belongs to family:** (GRW. GI. 2015)
    (A) Mimosaceae (B) Rosaceae (C) Fabaceae (D) Solanaceae

56. **Male reproductive parts of the flower are called:** (SWL. GII. 2016)
    (A) Gynoecium **(B) Androecium** (C) Calyx (D) corolla

57. **Vascular plants belonging to subdivision sphenopsida are commonly called:** (BWP. GI. 2014) (DGK. GII. 2018)
    (A) Whisk ferns (B) Club mosses **(C) Horsetails** (D) Ferns

58. **In Spermatophytes, seed is formed from :** (BWP. 2018)
    (A) Ovule (B) Ovary (C) Anther (D) Embryosac

59. **The known species of plants are about:** (AJK. 2018)
    (A) 3600 **(B) 36000** (C) 360000 (D) 3600000

60. **Which of the following were the first plants that formed true leaves and roots?** (MLN. GII. 2019)
    (A) Psilopsida **(B) Lycopods** (C) Megaphylls (D) Ferns

61. **After fertilization ovule is changed into:** (SGD. 2019)
    (A) Ovary **(B) Seed** (C) Fruit (D) Flower

SHORT ANSWER QUESTIONS

1. **What is phylogenetic system of classification?** (MLN. GI. 2014) (SWL. GI, AJK. GI. 2014) (GRW. 2019)

Ans. Phylogenetic System of Classification: The system of classification which is based on evolutionary history of organisms is known as phylogenetic system of classification.

2. **Quote four examples of ferns.** (LHR. GI. 2015)

Ans. Four examples of Ferns:
i. Dryopteris ii. Pteridium iii. Adiantum iv. Pteris

3. **What are amphibious plants of the world?** (LHR. GII. GRW. GI. DGK. GI. 2015) (GRW. GI. SGD. GI. 2016) (BWP. GI. 2017) (FBD. GII. 2019)

Ans. Amphibious plants: The bryophytes are called the amphibians of the plant world because they cannot live away from water for reproduction.

4. **Differentiate between antheridiophores and archegoniophores.** (SWL. GI. 2014) (DGK. GII. 2017) (BWP. 2019)

Ans.

Antheridiophores	Archegoniophores
i. Antheridiophores are special branches on gametophyte of marchantia bearing male sex organ antherdia.	i. Archegoniophores are special branches on gametophyte of marchantia bearing femal sex organ archegonia.
ii. Antheridia produces sperms by mitosis.	ii. Archegonia produces eggs by mitosis.

5. **Differentiate between monocots and dicots in arrangement of vascular tissue.** (LHR. GI. 2014)

Ans.

Monocots	Dicots
Vascular tissues in stem of monocots are usually scattered or more complex arrangement.	Vascular tissues in dicot stem are arranged in a circle (ring).

6. **Differentiate leaf venation and circinate vernation.** (LHR. GI. 2016)

Ans.

Leaf Venation	Circinate Vernation
It is the arrangement of veinus in the leaf blade of leaf.	It is the development pattern of leaf.

7. **What is protonema?** (DGK. GI, 2015) (SGD. GI, 2016) (BWP. GI, 2017) (LHR. GII, 2019)

Ans. Protonema: The spore of a moss develops into an alga like structure called protonema. Haploid moss plants gametophyte develop from buds on the protonema and the life cycle is completed.

8. **Write down two steps involved in the evolution seed.** (LHR. GI, 2014)

Ans. Two steps Involved in the Evolution Seed:

i. The evolution of heterospory.

ii. Retention and germination of megaspore within the megasprongium.

9. **Differentiate between ovule and seed.** (LHR. GII, 2014) (GRW. GI, 2016)

Ans.

Ovule	Seed
An ovule is a megasporangium containing female gametophyte and one or two integuments, layer of sporophytic tissue that surround and enclose the megasporangium.	Seed is very important structure in angiosperms as it leads to next generation. It has protective coverings so it can survive in dry conditions and can tolerate unfavourable condition. Whenever it finds suitable environment it will germinate.

10. **In which group brophytes is protonema produced?** (LHR. GI, 2016)

Ans. Group of Brophytes Producing Protonema: The group of Bryophytes which produce protonema is mosses.

11. **How overtopping and webbing occured in the evolution of leaf?** (LHR. GII, 2016)

Ans. Overtopping in the Evolution of Leaf: The dichotomously branched aerial portion of the stem showed unequal branching. Some branches remain short others grew in different places. Such an unequal development of various branches is called overtopping.

Webbing in the Evolution of Leaf: The space between the overtopped dichotomous branches was occupied by a sheet of parenchyma cells. These cells connected the branches forming a flat lamina or leaf blade type of structure.

12. **In what ways sporophytes of bryophyte and tracheophyte are different?** (AJK. GI, 2015)

Ans. Sporophyte of Bryophyte: It is a less concpiceous generation, which is usually differentiated into foot, seta and capsule (sporangium).

It is partially or completely dependent upon the gametophyte for hourishment and protection.

Sporophyte of Tracheophyte: It is a conspicuous generation which is differentiated into root, leaf and stem.

It is a photosynthetic generation which is not dependent upon gametophyte.

13. **Write the names of two extinct vascular plants.** (BWP. GI, 2015) (RWP. GI, 2016)

Ans. Two extinct vascular plants:

i. Horneophyton ii. Psilophyton

14. **How spores of mosses differ from spores of liverworts?** (GRW. GII, 2014)

Ans. Spores of Mosses: Spores of mosses develop into alga like structures, the protonema, the buds on which develop into male or female haploid gametophytes.

Spores of Liverworts: Spores of liverworts develop directly into male or female haploid gametophyte.

15. **What are fronds, in which group they are found?**
(BWP. GI, 2016) (LHR. GII, GRW. GI, MLN. GI & GII, 2017) (LHR. GI & GII, 2018)

Ans. Fronds: Fronds are (Compound) leaves of a fern bearing leaflets known as pinnae and pinnules. When the frond is immature and young, it is coiled, this pattern of development is called circinate vernation. It is an important character of ferns.

(SGD. GI, 2014) (LHR. GI, 2015) (DGK. GII, 2016)

16. Give common name of adiantum.

Ans. Common name of Adiantum is Maiden Hair Fern.

(FBD. GI, 2016)

17. What is prothallus?

Ans. Prothallus:

i. Prothallus is the haploid gametophyte of Adiantum.

ii. It is an autotrophic, small, flat, heart shaped structure.

iii. At the anterior end of the prothallus, is a notch in which lies the growing point.

iv. It is horizontally placed on the soil.

v. Porthallus has unicellular rhizoids on it lower surface towards the posterior end. The rhizoids fix the prothallus to the soil and absorb nutrients for it.

(DGK. GI, 2016)

18. What is Rhizome?

Ans. Rhizome: Rhizome is an underground plant stem that growth laterally from the main shoot.

(RWP. GI, 2016)

19. What is the earliest group of vascular plants?

Ans. Psilopsida is considered to be the earliest group of vascular plants.

(BWP. GII, 2016)

20. Differentiate between calyx and corolla.

Ans.

Calyx	Corolla
The sepals of the flower are collectively called calyx. It is non-essential or non-reproductive part of the flower. It protects the other parts of flower. It is green in colour.	The petals of the flower are collectively called corolla. It is usually brightly coloured (other than green). It is non-essential or non-reproductive parts of the flower. It surrounds the reproductive parts of the flower and helps in pollination by attracting insects.

21. Differentiate between bryophytes and tracheophytes. (LHR. GI, 2017)

Ans.

Bryophytes	Tracheophytes
i. Gametophyte in bryophytes is dominant. Sporophyte of bryophytes is dependant on gametophytes.	i. Sporophyte is dominant in tracheophytes. Gametophyte is reduced and inconspicuous.
ii. Vascular tissues are absent.	ii. Vascular tissues are present in them.
iii. Sporophyte of bryophytes is generally composed of foot, seta and capsule.	iii. Sporophyte of tracheophytes is generally composed of root, stem and leaves.

22. What is plannation in leaf evolution? (RWP. GII, 2016)

Ans. Plannation in Leaf Evolution: Branching in same plane is called plannation. The plannation was a step which took place in the evolution of megaphyll leaf in which unequal dischotomies were arranged in one plane.

23. Differentiate between microphylls and megaphylls.

(GRW. GI, 2014) (GRW. GI & GII, AJK. GI, 2015) (LHR. GI, GRW. GII, SWL. GI, 2016) (SWL. GI, 2017) (MLN. GI, AJK. 2018) (SGD. 2019)

Ans.

Microphylls	Megaphylls
i. Microphylls are small and single veined leaves.	i. Megaphylls are larged leaves having divided veins and veinlets with an expended leaf blade or lamina.
ii. Microphylls are present in lycopsids.	ii. Megaphylls are present in ferns and seed plants.

24. **What is the importance of Heterospory?** (RWP. GI, 2017)

Ans. Importance of Heterospory: The evolution of heterospory was an essential step in the evolution of seeds. Primitive vascular land plants produced spores which were all morphologically and structurally alike, a condition called homospory. All groups of land plants up to pteridophytes (lower vascular plants such as club mosses, horsetails) are homosporous. During the early phase of evolution some plant groups started producing morphologically, structurally and functionally two different types of spores. This condition is called heterospory. The smaller spores are called microspores and the larger ones are known as megaspores.

25. **What is overtopping?** (RWP. GI, 2017) (DGK. GI, AJK. 2018)

Ans. Overtopping: The unequal development of various branches is called overtopping. There were some unequal branches on the dichotomously branched aerial portion. Some branches remained short, while other branches grew and expanded at a much faster pace. All these branches grew in different planes.

26. **Define ovule and embryo sac.** (SGD. GI, 2014) (DGK. GI, 2016) (LHR. GI, 2017) (RWP. 2018)

Ans. Ovule: An ovule is an integumented indehiscent megasporangium.

Embryo sac: It is the female gametophyte of a seed plant consisting of a thin walled sac within the nucellus that contains the egg nucleus and other nuclei which give rise to endosperm on fertilization.

27. **Define seed and fruit.** (SGD. GI, RWP. GII, 2016)

Ans. Seed: A seed is a ripened and fertilized ovule.

Fruit: Fruit is the seed-bearing structure in flowering plants formed from the ovary after fertilization.

28. **Differentiate between homuspory and heterospory.** (LHR. GI, 2016) (MLN. GII, 2018) (MLN. GI, SWL. RWP. 2019)

Ans.

Homospory	Heterospory
i. Homospory is a condition in which plants produce same kind of spores.	i. Heterospory is a condition in which plants produce different kind of spores.
ii. Homosporous plants produce same kinds of spores.	ii. Heterosporous plants produce different kind of spores as under i. Microspore ii. Megaspore
Example: All groups of land plants up to pteridophytes are homosporous.	**Example:** Spermatophytes are heterosporous plants

29. **Give four examples of Gymnosperms given in your book.** (RWP. GI, 2016)

Ans. Examples of Gymnosperms:

i. Cycas .... Sago palm
ii. Pinus .... Pine
iii. Cedrus .... Deodar
iv. Picea .... Hemlock

30. **What are gymnospermae? Give examples.** (SGD. GI, 2015) (LHR. GII, 2016) (MLN. GII, 2017)

Ans. Gymnospermae: The term gymnospermae literally means "Naked Seeded". The gymnospermae are heterosporous plants which produce Seeds but no fruits. The ovules in these plants are usually born on the exposed surfaces of megasporophylls. Gymnosperms have independent, dominant sporophyte but less conspicuous, dependent gametophyte.

Exmaples: Cycas, pinus and ginkgo etc.

31. Differentiate between male and female cones of pinus. (MLN, GI, 2015) (MLN, GII, 2019)

Ans.

Male Cones of Pinus	Female Cones of Pinus
i. Male cones of pinus are small and produced in clusters on an axis.	i. Female cones are large and conspicuous.
ii. Each male cone consists of microsporophylls which contain microsporangia.	ii. Each Female cone is composed of large number of spirally arranged scales, the megasporophylls which are woody in texture. At the base of each scale two ovules are present which are actually megasporangium protected by integuments.

32. State the structure of female gametophyte of an angiosperm. (DGK, GI, 2014)

Ans. Structure of Female Gametophyte of an Angiosperm:

The changes take place in the ovule leading to the formation of female spore (megaspore). The megaspore develops into female gametophyte. It consists of seven cells only. One of these cells is the egg or oosphere.

33. How does gymnosperm differ from Angiosperms? Give two points only. (RWP, GII, 2017)

Ans.

Gymnosperm	Angiosperm
i. They are naked seeded plants. Their seed is not enclosed in fruits.	i. Their seed is covered by fruits.
ii. They do not produce flowers.	ii. They produce flowers.

34. Define Flower. What are essential and non-essential parts of flower?

(GRW, GI, 2014) (GRW, GII, 2015) (BWP, GI, 2016) (FBD, MLN, GI, SWL, 2018)

Ans. Flower: Flower is very important reproductive part of plant. It helps in pollination due to its colour, fragrance and nectar.

Essential parts of flower: Staments and carples are the essential or reproductive parts of a flower.

Non-essential parts of flower: Sepals and petals are the non-essential or non-reproductive parts of a flower.

35. Define double fertilization.

(GRW, GI & GII, 2014) (LHR, GI, MLN, GI, SGD, GII, RWP, GI, DGK, GII, 2015) (LHR, GI, DGK, GII, 2016) (LHR, GI, SWL, GI, RWP, GI, 2017) (RWP, 2019)

Ans. Double Fertilization: Double Fertilization is the process in angiosperms, in which one sperm form a pollen grain fuses with the small egg cell of the megagametophyte, while the second sperm penetrates the adjoining large endosperm cell containing the two polar nuclei.

Importance of Double Fertilization in Food Storage: The triploid (3n) endosperm cell formed in double fertilization develops into food storing endospermic tissue. It is an important evolutionary advancement in which food storage in fertilized ovule is made on fertilization in the formation of zygote. This actually helps the plant to economize its food resources.

36. Differentiate between floret and spikelet. (BWP. GI. 2015)

Ans.

Floret	Spikelet
The whole (lemma, Palea and flower) termed as floret; the glumes or lemmas often bearing one or more stiff bristles (called awns); this basic pattern of spikelet structure is consistent throughout the poaceae family.	Spikelet is small dry spike which has only one or a few sessile flowers. It is surrounded at the base by special bracts called glumes. Spikelets of grasses vary widely in different genera particularly as to number of fertile florets in each, and deposition of sexes with them.

37. Write down biological names of Shisham and Sweet Pea. (GRW. GI. 2015)

Ans. **Shisham:** Dalbergia sissoo

Sweet pea: Lathyrus odoratus

38. Differentiate between microgametophyte and megagametophyte. (LHR. GII. 2018)

Ans.

Microgametophyte	Megagametophyte
Microgametophyte is male gametophyte. The microspores produced inside microsporangia germinated to form microgametophyte.	Megagametophyte is female gametophyte. The megaspores produced inside macrosporangia germinated to form female gametophyte or megagametophyte.

39. Define circinate vernation. Give an example. (LHR. GII. 2018)

Ans. **Circinate Vernation:** When the frond is immature and young, it is coiled, this pattern of development is called circinate vernation.

Example: Adiantum show circinate veration.

40. Define kingdom plantae. (GRW. 2018)

Ans. **Kingdom Plantae:** There are different types of plant species, which are found on planet earth. They are sorted and classified into a separate kingdom known as kingdom plantae. This classification is based on their similarities and differences.

41. What is homospory? Give one example. (GRW. 2018)

Ans. **Homospory:** Primitive vascular land plants produced spores which were all morphologically and structurally alike this condition is called homospory.

Example:

All groups of land plants up to pteridophytes (lower vascular plants such as club mosses, horsetails) are homosporous.

42. What are homosporous and heterosporous plants? Give examples. (FBD. 2018)

Ans. **Homosporous Plants:** All groups of land plants up to pteridophytes (lower vascular plants such as club mosses, horsetails) are homosporous plants.

Heterosporous Plants: Primitive vascular land plants producing morphologically, structurally and functionally two different types of spores are called heterosporous plants.

43. Differentiate between Overtopping and Plantation. (MLN. GII. 2018)

Ans.

Overtopping	Plantation
The dichotomously branched aerial portion of the stem showed unequal branching. Some branches remain short others grew in different planes. Such an unequal development of various branches is called overtopping.	The arrangement of unequal dichotomies (branches) in one plane is termed as plantation.

44. **Write four characteristics of bryophytes.** (LHR. GI. 2014) (DGK. GI. 2018)

Ans. Four characteristics of Bryophytes:

i. **First Land Plants:** The first plants to colonize land were the bryophytes. They are generally thought to have evolved from green algae.

ii. **Adaptation and Habitat:** The bryophytes are poorly adapted to life on land and are mainly confined to damp shady places.

iii. **No Conducting Tissues:** These plants are devoid of specialized conducting (xylem and phloem) and strengthening tissues.

iv. **Flowerless:** The bryophytes are flowerless, non - vascular plants.

45. **Differentiate between monocotyledonous and dicotyledonous** (DGK. GII. 2019)

Ans.

Monocotyledonous	Dicotyledonous
i. The plants included in the Monocotyledonae are called monocotyledonous plants or monocots.	i. The plants included in the dicotyledonae are called dicotyledonous.
ii. The monocotyledonae is the sub - class of angiosperm having one cotyledon.	ii. The dicotyledonae is sub - class of angiosperm having two cotyledons.

46. **Which plant group is called arthrophytes and why?** (LHR. GI. 2019)

Ans. Plants belonging to this group are called artbophytes because the whole plant body is composed of large number of joints. Sphenopsida plant group called arthophytes.

47. **What are lenticels? Write their use.** (LHR. GI. 2019)

Ans. It is loss of water vapours through lenticels. Lenticels are the cork cambium forms, oval, spherical, or irregular cells which are loosely arranged and have many inter cellular spaces. Lenticels are aerating pores and they involved in the exchange of gases.

48. **What are integuments?** (LHR. GII. 2019)

Ans. Integuments: Integuments are specialized protective coverings around megasporangium which vary in number.

49. **What are antheridiophores and archegoniophores?** (MLN. GI. 2019)

Ans. Antheridiophores and Archegoniophores:

The sex organs develop on the upper surface of the thalus near the tips of the branches. Sometime they develop on special branches on gametophyte called the Antheridiophores and the Archegoniophores in Marchantia.

50. **Why it is generally accepted that plants arose from ancestral green algae?** (SGD. 2019)

Ans. Reason: Green algae are considered as ancestors of green plants because:

i. They have pigments, energy reserve products and cell walls are identical to plants.

ii. Green algae have photosynthetic, pigments, chlorophyll b and carotenoids like plants.

iii. Cell walls have cellulose, like green plants.

51. **Define double fertilization in Angiosperm?** (DGK. 2019)

Ans. Double Fertilization: Double fertilization is a special process found in Angiosperms. When two male gametes fuses with two cells. A male gamete (n) fuse with egg (n) to form adiploid zygote (2n) which develop later into embryo and 2nd male gamete (n) fuses with another female cell called fusion nucleous (2n) resulting into triploid (3n) endosperm cell which develops into food storing endosperm tissue. It is an important evolutionary advancement in which food storage in fertilized ovule is made on fertilization formation of zygote.

52. **What is role of endosperm?** (AJK 2019)

Ans. **Role:** Endosperm is a part of the seed that acts as a food store for the developing embryo of plants. Endosperm is formed by the triple fusion of primary endosperm nucleus during double fertilization of angiosperms. Nutrients in the endosperm can be consumed by humans and animals as food.

53. **Why bryophytes need water for reproduction?** (AJK 2019)

Ans. Bryophytes needs water for their reproduction. Their flagelleated sperm must swim through water to reach the eggs.

54. **How stomata is regulated by hormone?** (AJK 2019)

Ans. Hormones are involved in stomatal movement in plants. At high temperature when leaf cells start wilting a hormone is released mesophyll cells. This hormone is called abscisic acid. This hormone stops the active transport of K^+ into guard cell, overriding the effect of light and CO_2 concentration. So K^+ pumping stops stomata close.

ESSAY TYPE QUESTIONS

Q1. Write a note on adaptation of Bryophytes for life on land.
(LHR. GI, GRW. GI, 2014) (AJK. GI, 2015) (LHR. GI, FBD. GI, 2016) (BWP. GII, 2017) (MLN. GI, SGD. 2018) (LHR. GII, FBD. GII, MLN. GI, SWL. 2019)

Q2. Discuss the different adaptive characters for terrestrial environment in Bryophytes? (LHR. GII, 2016) (BWP. GII, 2017)

Q3. Write down the life cycle of adiantum.
(FBD. GI, 2015) (LHR. GI, DGK. GII, 2017) (MLN. GII, 2018) (MLN. GII, BWP, AJK. 2019)

Q4. Describe gametophyte stage in the life history of Adiantum.
(GRW. GII, 2014) (MLN. GII, 2018)

Q5. Describe in detail evolution of leaf. (MLN. GI, BWP. GI, 2014) (BWP. GI, SGD. GII, 2015) (SGD. GI, 2016) (MLN. GII, 2017) (LHR. GI, 2018)

Q6. Write main steps of evolution of megaphyll leaf.
(LHR. GII, 2015) (GRW. GII, 2016)

Q7. Discuss at least four steps leading to the evolution seed habit.
(SWL. GI, 2014) (DGK. GI, 2016)

Q8. Enlist the steps involved in evolution of seed. Describe any two in detail.
(GRW. GI, 2014) (GRW. GII, 2015)

Q9. Give the list of various steps involved in the evolution of seed Habit?
(GRW. GI, DGK. GII, 2016) (FBD. GI, MLN. GI, 2017)

Q10. Describe the life cycle of an angoispermic plant. (DGK. GI, 2015) (FBD. GI, 2019)

Q11. Differentiate between Monocots and Dicots. (BWP. GI, AJK. GI, 2016) (GRW. GI, 2017)

Q12. Describe prothallus of adiantum. (LHR. GII, 2018)

Q13. Define angiosperms. Explain double fertilization in angiosperms. How angiosperms differ from gymnosperms. (FBD. 2018)

Q14. Differentiate between microphylls and megaphylls and describe evolution of megaphylous leaf. (DGK. GI, 2018)

Q15. Write down characteristics of class gymnospermae. (DGK. GII, 2018)

Q16. Discuss life cycle of Maiden-hairfern. (GRW. 2019)

✻✻✻✻

CHAPTER 10

Kingdom Animalia

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. **Shark liver oil is source of:** (LHR. GII, 2014)
   (A) Antibiotics (B) Food **(C)** Vitmin A and D (D) Vitamin B and C
2. **These animals have large canine:** (LHR. GII, 2014)
   (A) Carnivores (B) Detritivores (C) Herbivores (D) Omnivores
3. **Which is not related to other?** (LHR. GII, 2015)
   (A) Kiwi (B) Eagle (C) Crow (D) Pigeon
4. **The integumentary and nervous system are developed from:** (SGD. GI, 2015)
   (A) Endoderm (B) Mesoderm **(C)** Ectoderm (D) Mesoglea
5. **The animals without a body cavity are called:** (RWP. GI, 2016)
   (A) Eumetazoa (B) Pseudocoelomata (C) Coelomata **(D)** Acoelomata
6. **The body cavity of Nematoda is:** (LHR. GI, MLN. GI, 2017)
   (A) Blastocoel **(B)** Pseudocoelom (C) Haemocoelom (D) Coelom
7. **Enterobius vermicular is called:** (LHR. GI, 2014) (GRW. GII, 2015)
   (A) Shipworms (B) Hookworms (C) Bookworms **(D)** Pinworms
8. **In mollusca, a blue colored respiratory pigment is:** (LHR. GI, 2014) (AJK. GI, 2016) (LHR. GI, 2015)
   (A) Hemoglobin (B) Hemoerythrin
   (C) Haemocyanin (D) Prothrombin
9. **The asexual reproduction in sponges occurs by:** (LHR. GII, 2014) (DGK. GII, 2017) (LHR. GII, 2016)
   (A) Fragmentation (B) Multiple fission (C) Binary fission **(D)** Budding
10. **Pseudocoelom is present in:** (RWP. GI, 2017)
    (A) Cnidaria (B) Flat worms **(C)** Round Worms (D) Earth Worms
11. **Pseudocoelom is characteristic feature of:** (RWP. GI, 2017)
    (A) Aschelminthes (Nematoda) (B) Annelida
    (C) Mollusca (D) Porifera
12. **The cartilaginous fishes contain scales:** (LHR. GII, 2016)
    (A) Placoid (B) Cycloid (C) Ganoid (D) Ctenoid
13. **Which is the sequence of bones in the mammalian ears:** (LHR. GI, 2016)
    (A) Malleus, incus and stapes (B) Incus and sapes
    (C) Stapes and malleus (D) Malleus and stapes
14. **The inner layer of most sponges is called:** (MLN. GI, 2016)
    (A) Pinacoderm **(B)** Choanoderm (C) Endoderm (D) Epiderm
15. **Number of legs in arachnids is:** (LHR. GII, 2016)
    (A) 2 (B) 4 (C) 6 **(D)** 8
16. **Animals that have their body cavity filled with parenchyma are:** (GRW. GI, 2016)
    (A) Acoelomates (B) Coelomates (C) Pseudocoelomates (D) Mesoderms

17. **The animal with exceptionally large brain is:** (LHR. GI. 2017)
(A) Star fish **(B) Octopus** (C) Snail (D) Sepia

18. **The pores by which the water leaves the body of sponges are called:** (MLN. GI. 2017)
(A) Ostia (B) Mouth (C) Anus **(D) Osculum**

19. **Venus flower basket is:** (FBD. GI. 2017)
(A) Sycon (B) Leucosolenia **(C) Euplectella** (D) Spongilla

20. **Most spiders have eyes:** (GRW. GII. 2014)
(A) 2 (B) 4 (C) 6 **(D) 8**

21. **Aquatic arthropods respire through:** (GRW. GI. 2014) (GRW. GII. 2015)
(A) lungs (B) Skin **(C) Gills** (D) Spiracles

22. **The larva found in echinoderms is:** (GRW. GI. 2014) (GRW. GI. 2015)
(A) Trochophore (B) Valiger **(C) Bipinnaria** (D) Planaria

3. **The polyp is reduced and medusa is dominant:** (BWP. GI. 2014)
(A) Sea Anemon **(B) Jelly fish** (C) Obelia (D) Hydra

4. **The number of round worms in a single rotting apple is:** (RWP. GI. 2014)
(A) 85000 (B) 8000 (C) 95000 **(D) 90000**

5. **The phylum which is exclusively marine is:** (GRW. GI & GII. 2016)
(A) Cnidaria (B) Porifera **(C) Echinodermata** (D) Annelida

Flame cells are excretory cells in: (DGK. GI. 2016) (GRW. GI. 2017)
(A) Flat worms (B) Segmented worms (C) Round worms (D) Insects

The presence of notochord is the character of: (GRW. GI. 2016)
(A) Arthropoda (B) Mollusca (C) Nematoda **(D) Chordata**

Hydra belongs to phylum: (RWP. GI. 2016)
(A) Mollusca **(B) Cnidaria** (C) Annelida (D) Arthropoda

A free swimming trochophore larva is produced during life cycle of: (LHR. GI, RWP. GI. 2014) (RWP. GI. 2015)
(A) Coelenterata (B) Porifera **(C) Annelida** (D) Arthropoda

Sea Urchin belongs to phylum: (MLN. GI. 2017) (RWP. 2019)
(A) Coelanteata (B) Porifera (C) Nematoda (D) Arthropoda

Polyp and Medusa are examples of: (MLN. GII. 2017)
(A) Coelentrata (B) Porifera (C) Nematoda (D) Arthropoda

Sea anemone belongs to phylum: (LHR. GI. 2017)
(A) Coelenterata (B) Arthropoda (C) Echinodermate (D) Annelida

The animals which are on the boarder line between aquatic and true terrestrial animals belong to: (SGD. GI. 2014)
(A) Reptilia (B) Mammalia **(C) Amphibian** (D) Aves

Dolphin is: (SGD. GII. 2014) (MLN. GI. 2019)
(A) Fish (B) Bird (C) Amphibian **(D) Mammal**

The color of the blood of Molluscans is: (SGD. GII. 2015)
(A) Red (B) White (C) Green **(D) Blue**

Which one of the following is not a sub phylum of chordata? (SGD. GI. 2014) (SGD. GII. 2016)
(A) Urochordata **(B) Hemichordata**
(C) Cephalochordata (D) Verteberata

37. **Primary host of tape worm is:** (GRW. GI. 2014)
(A) Man (B) Cattle (C) Sheep (D) Snail

38. **The second largest phylum of invertebrates is:** (BWP. GI. 2014)
(A) Annelida (B) Mollusca (C) Echinodermata (D) Platyhelminthes

39. **Ancylostoma duodenal is biological name of:** (LHR. GI. 2015) (GRW. 2019)
(A) Flatworm (B) Hook worm (C) Round worm (D) Fluke

40. **Round worms are:** (DGK. GI. 2015)
(A) Acoelomates (B) Pseudocoelomates (C) Coelomates (D) None of Them

41. **Parapodia are the organs of locomotion in:** (DGK. GII. 2016)
(A) Neries (B) Earthworm (C) Leech (D) Planaria

42. **Nephridia are excretory structures of:** (DGK. GI. 2016)
(A) Sponges (B) Annelids (C) Arthropods (D) None of Them

43. **A blue coloured respiratory pigment called hemocyanin is found in:** (DGK. GII. 2016)
(A) Molluscs (B) Arthropods (C) Annelids (D) Echinoderms

44. **Metamerically Segmented animals are belonging to the:** (SWL. GI. SGD. GI. 2016) (AJK. GI. 2017)
(A) Annelids (B) Cnidarians (C) Molluscs (D) Echinoderms

45. **Blood of Arthropoda is:** (LHR. GI. 2013)
(A) Green Colour (B) Red Colour (C) Brown Colour (D) Colourless

46. **In arthropods, blood is colorless, as it is without:** (AJK. GI. 2016)
(A) Chlorophyll (B) Hemoglobin (C) Hemocyanin (D) Haemoirythrin

47. **A rasping tongue like radula having horny teeth is present in:** (FBD. GI. 2015)
(A) Sponges (B) Coelenterates (C) Annelids (D) Molluscs

48. **Slow worm belongs to phylum:** (GRW. GI. 2016)
(A) Annelids (B) Platyhelminthes (C) Aschelminthes (D) Chordata

49. **Animals of which phylum have developed bilateral symmetry in their larvae and radial symmetry in adults:** (BWP. GI. 2016)
(A) Nematoda (B) Annelida (C) Mollusca (D) Echinodermata

50. **The spinny skinned animals are included in:** (FBD. GI. 2015)
(A) Porifera (B) Echinodermata (C) Annelida (D) Mollusca

51. **Scales in pangolin are actually:** (GRW. GI. 2016)
(A) Modified rings (B) Modified hairs (C) Modified feathers (D) Spines

52. **The larvae such as bipinnaria and brachiolaria develop in members of phylum:** (AJK. GI. 2017)
(A) Cnidaria (B) Mollusca (C) Annelida (D) Echinodermata

53. **The example of phylum Hemichordata is:** (MLN. GI. 2018)
(A) Molgula (B) Amphioxus (C) Asterias (D) Balanoglossus

54. **Ascaris lumbricoides is an intestinal parasite of:** (LHR. GII. 2018)
(A) Horse (B) Man (C) Donkey (D) Monkey

55. **Pseudocoelom is characteristic feature of phylum:** (GRW. 2018) (AJK. 2017)
(A) nematoda (B) echinodermata (C) mollusca (D) annelida

56. **Which of the following is a motile coelenterate?** (GRW. 2019)
(A) hydra (B) obelia colony (C) jelly fish (D) corals

57. **Haemocyanin is found in the phylum:** (FBD. 2018)
(A) Echinodermeta **(B) Mollusca** (C) Hemichordata (D) Chordata

58. **In sponges asexual reproduction takes place by budding. The internal buds are called:** (MLN. GI. 2018)
(A) Globules **(B) Gemmules** (C) Endosperm (D) Cyst

59. **The skeleton of sponges are called as:** (AJK. 2018)
(A) Gemmules **(B) Spicules** (C) Tentacles (D) Corals

60. **In animals the digestive system develops from:** (AJK. 2018)
(A) Ectoderm (B) Mesoderm (C) Endoderm (D) Peviderm

61. **The number of pairs of spiracles in abdominal segments of cockroach are:** (GRW. 2019)
(A) 02 (B) 12 (C) 08 **(D) 10**

62. **All "flatworms" belong to phylum:** (GRW. 2019)
(A) annelida **(B) platyhelminthes** (C) arthropoda (D) nematoda

63. **Coral reefs are mostly formed of:** (MLN. GI. 2019)
(A) Calcium carbonate (B) Silica
(C) Chitin (D) Lignin

64. **Pseudocoel is found in:** (MLN. GII. 2019)
(A) Ascaris (B) Neries (C) Lumbricus (D) Pheretima

65. **Dugesia is a free-living flatworm with a ciliated outer surface. It is commonly called:** (SGD. 2019)
(A) Tape worm (B) Liver fluke (C) Blood fluke **(D) Planaria**

66. **Reproductive system is formed from:** (DGK. 2019)
(A) Mesoderm **(B) Endoderm** (C) Ectoderm (D) Hypoderm

67. **In Echinodermata the larva is:** (DGK. 2019)
(A) Planula (B) Trochophore **(C) Bipinnaria** (D) Echino

68. **Molluscs has a respiratory pigment of blue colour, called:** (BWP. 2019)
(A) Haemoerythrin **(B) Haemocyanin** (C) Haemoglobin (D) Myoglobin

SHORT ANSWER QUESTIONS

1. **Why Annelids and Arthropods are considered having same origin?** (BWP. GI. 2015) (LHR. GI, FBD. GI. 2016)

Ans. Annelids and Arthropods have same origin because both share the characteristics of having body divided into similar segments, appendages and cuticle.

2. **Differentiate between radial and bilateral symmetry.** (LHR. GII. 2015) (FBD. GI. 2016) (LHR. GII. 2017) (DGK. GII. 2018)

Ans.

Radial Symmetry	Bilateral Symmetry
Radial Symmetry is a condition Or Organization In which the body parts of the body are arranged around a central axis in such a way that any plane passing through the central axis divides the animal in halves that are almost mirror image of each other. **Examples:** Hydra, Sea Squirts etc.	Bilateral symmetry is a condition or organization in an animal where the right side is approximately the same as the left side. And where there is a distinct anterior and posterior end. The animal can be divided into two equal parts by an imaginary line only in one plane. **Examples:** Fishes, amphibians, reptiles birds and mammals

3. **Differentiate between diploblastic and triploblastic animals.** (FBD. GI, 2015) (SWL. GI, DGK. GII, BWP. GI, 2016) (FBD. GI, MTN. GII, 2017) (LHR. GII, 2019)

Ans.

Diploblastic Animals	Triploblastic Animals
i. The body of diploblastic animals consist of two layers of cells, ectoderm and endoderm. ii. Diploblastic animals show lesser degree of specialization and do not form specialized organs. **Examples:** All animals having radial symmetry are diploblastic.	i. The body of triploblastic animals consists of three layers of cells, ectoderm, mesoderm and endoderm. ii. Triploblastic animals show greater degree of specialization and form specialized organs and organ systems. **Examples:** All animals having bilaterial symmetry are triploblastic.

4. **Differentiate between schizocoelous and enterocoleous coelum.** (BWP. GI, 2014) (BWP. GII, 2015) (LHR. GII, 2019)

Ans.

Schizocoelous Coelom	Enterocoelous Coelom
Coelom or body cavity which is formed by splitting of mesoderm is termed as schizocoelous coelom.	Coelom which is developed as an outpouching of archenterons is termed as enterocoelous coelom.

5. **What is radial and indeterminate cleavage?** (DGK. GI, 2015)

Ans. **Radial and indeterminate cleavage:** In radial and indeterminate cleavage, the planes of cleavage are symmetrical to the polar axis and produce, tiers of cells on top of each other and the fate of each blastomere is not pre-determined. In some deuterostomes blastomere can produce a complete embryo.

6. **Differentiate between cold Blooded and Warm Blooded animals.** (LHR. GI, 2014)

Ans.

Cold Blooded Animals	Warm Blooded Animals
These are the animals whose body temperature varies as the external temperature changes. They have lower metabolic rates at colder temperatures. **Examples:** Fishes, amphibians, reptiles.	These are the animals which maintain a constant body temperature that is generally higher than the environmental temperature, regardless of the sexual temperature. They all have high metabolic rates. **Examples:** Birds and mammals.

7. **Differentiate between sac-like and tube-like digestive systems.** (LHR. GI, 2015) (SWL. GI, 2017)

Ans.

Sac-like digestive system	Tube-like digestive system
i. Digestive system having only one cavity in the body which has only mouth for the entry of food and water and also for the removal of wastes along with water is known as sac-like digestive system. ii. Diploblastic animals have sac-like digestive system.	i. Digestive system having mouth at the anterior end and the anus at the posterior end is known as tube-like digestive system. ii. Triploblastic animals have tube-like digestive system.

8. **What is coelom?** (LHR. GI, 2014)

Ans. **Coelom:** Coelom is a cavity between the body wall and the alimentary canal and is lined by mesoderm.

9. **What is a Gastrovascular cavity?** (AJK. GI. 2016)

Ans. **Gastrovascular Cavity:** It is a cavity which has only mouth which serves for the entry of food and water and also for the removal of wastes along with water. This is known as sac like digestive system. It is found in diploblastic animals.

10. **Define the term Spiral cleavage.** (GRW. GI. 2016)

Ans. **Spiral Cleavage:** A spiral cleavage is that in which two lines or planes of cleavage are not symmetrical between poles instead these are diagonal to the polar axis and produce unequal cells around the axis of polarity and all the blastomeres have determine role to play in the formation of embryo.

The spiral cleavage is also termed as determinate cleavage as the fate of each blastomere is foretold.

11. **How Acoelomates differ from pseudocoelomates?** (GRW. GI. 2016) (MLN. GII. BWP. GI. 2017)

Ans.

Acoelomates	Pseudocoelomates
i. The animals in which there is no body cavity or coelom are called acoelomates.	i. The animals having pseudocoelom or false body cavity are called pseudocoelomates.
ii. In acoelomates, the mesoderm forms a loose, cellular tissue called mesenchyma or parenchyma which fills the space between ectoderm and endoderm.	ii. In Pseudocoelomates, the space between the body wall and the digestive tube is called pseudocoelom.
iii. Mesenchyme forms a packing around the internal organs of the animals of support or protect them.	iii. Pseudocoelom develops from the embryo and it is bounded externally by the muscles and internally by the cuticle of the intestine.

12. **Differentiate between Nerve Cord and Notochord.** (GRW. GI. 2014)

Ans.

Nerve Cord	Notochord
It is a hollow tubular cord which is a part of nervous system of the animal and is present in embryo as well as in adults.	It is a rod-like semi-rigid body of vacuolated cells which are filled with proteinaceous material and is present in embryos of chordates.

13. **What are diploblastic animals?** (AJK. GI. 2016) (FBD. 2018)

Ans. **Diploblastic Animals:**

Diploblastic animals belongs to division radiate. The body of these animals consists of two layers of cells, ectoderm and endoderm. Diploblastic animals show lesser degree of specialization and do not form specialised organs.

Example: Diploblastic animals are included in phylum Cnidaria (coelenterate).

14. **Define the term Metameric segmentation.** (BWP. GII. 2016)

Ans. **Metameric Segmentation:** Metameric segmentation refers to the division of body i.e; serial repetition of body structures in the longitudinal axis e.g. vertebrae, ribs, nerves, muscles etc.

15. **Define gemmules and protandrous.** (AJK. GI. 2015) (SGD. GI. BWP. GI. 2016) (FBD. GI. 2017)

Ans. **Gemmules:** Sponges reproduce asexually by budding. The buds may be external or internal, the internal buds are called gemmules. Both types of buds develop into new sponges.

Protandrous: Sponges are hermaphrodite. In most sponges, male sex cells develop first so

they are termed as protandrous.

(GRW. GI, BWP. GI, 2014) (GRW. GI & GII, 2015)

16. **Write down the importance of sponges.**

(LHR. GI, DGK. GII, BWP. GI, 2016) (GRW. GI, 2017) (SGD. 2018) (FBD. GI, 2019)

Ans. Importance of sponges:

i. The skeleton of sponges are used for washing and bathing.

ii. Sponges are used in surgical operations for absorbing fluids and blood.

iii. Sponges are used for sound absorption in buildings.

(FBD. GI, 2014)

17. **What are Parazoa and Metazoa?**

Ans. Parazoa: The simplest of the animals belong to subkingdom Parazoa (phylum Porifera). These animals lack tissues organized into organs and have indeterminate shape and are asymmetrical.

Metazoa (Eumetazoa): The subkingdom Eumetazoa includes phyla other than porifera. These animals have tissues organized into organs and organ systems. These include radially symmetrical animals (grade Radiata) and bilaterally symmetrical animals (grade Bilateria).

(FBD. GI, MLN. GI, 2014)

18. **How Ostia differ from Osculum?**

Ans.

Ostia	Osculum
i. The pores in body wall of sponges through which water enters the body are called Ostia.	i. The pores in body all of sponges by which water leaves the body is known as Osculum.
ii. Ostia are present throughout the body wall, hence sponges are biological termed as poriferans.	ii. Osculum is located at anterior end of the body of sponges, leading to cavity in side the body, the spongocoel.

19. **What are Cnidocytes?**

(LHR. GI, 2015) (FBD. 2018)

Ans. Cnidocytes: Cnidocytes are specialized cells which give rise to nematocysts. Nematocysts are the stinging cells which are chatacteristic of phylum cnidaria.

20. **Differentiate between polyps and medusae.**

(SWL. GI, 2014) (RWP. GI, 2015) (MLN. GI, DGK. GII, 2016) (LHR. GI, 2017) (RWP. 2018)

Ans.

Polyps	Medusae
i. Polyps are cylindrical animals, which in most cases are nutritive in function, hence named gastrozoids.	i. Medusae are umbrella like and are free swimming.
ii. Polyps reproduce asexually and give rise to medusae.	ii. Medusae reproduce sexually as they have gonads and give rise to polyps.

21. **What are coral reefs?**

(FBD. GI, SWL. GI, 2014) (DGK. GII, 2015) (LHR. GI, 2016) (RWP. GI, 2017)

Ans. Corals Reefs: The strong network or mass of some coelenterates are called corals. Living polyps are found on the surface layer of corals whereas underneath the mass are dead stony structures only and there are no polyps inside. The stony masses that are formed in this way are called coral reef which are mostly formed of calcium carbonates.

Importance of corals: The corals because of their massive structure serve as living place for a variety of sea life.

22. **Give the reproduction in platyhelminthes.**

(MLN. GI, 2014)

Ans. Reproduction in Platyhelminthes: Platyhelminthes reproduce both by sexual and asexual

means of reproduction.

Asexual reproduction: Asexual reproduction in platyhelminthes is by fission in which the animal constricts in the middle into two pieces, each of which regenerates the missing part.

Sexual Reproduction: The sexually reproducing species are hermaphrodite, i.e., both male, and female reproductive organs are present in the same individual.

23. What are nematocysts? Give their function. (GRW. GI. 2016)

Ans. Nematocysts: Nematocysts are the stinging cells, embodded in tentacles and are developed from cnidocytes. Nematocysts are characteristics of phylum coelenterate.

Function of Nematocysts:

i. Each nematocysts consists of a hollow thread coiled within a capsule and a tiny hair like trigger, projecting outside.

ii. When a prey such as Daphnia or Cyclops comes in contact with the cnidocil the hollow thread of the nematocyst turns inside out, ejects poison and the prey is paralyzed or sometimes killed.

24. What is hermaphrodite animal? Give an example: (MLN. GI. 2015) (SGD. GI, DGK. GI. 2016)

Ans. Hermaphrodite Animal: The animal which has both male and female reproductive organs, present in the same individual is known as hermaphrodite.

Example: Animals belong to phylum platyhelminthes.

25. Differentiate between urochordates and cephalochordates. (SGD. GI. 2017)

Ans.

Urochordates	Cephalochordates
Notochord and Nerve cord are present only in the free swimming larvae. Adults are sessile and enclosed in a covering called tunic. Therefore they are also called tunicate e.g. Molgula, Herdmania.	Notochord and nerve cord extend along the entire length of the body and persist throughout life e.g. Amphioxus.

26. Write the two members of platyhelminthes. (SGD. GII. 2015)

Ans. Two members of platyhelminthes:

i. **Planaria:** Planaria is free living flatworms with a ciliated outer surface.

ii. **Liver fluke:** Liver fluke is an ectoparasite flatworm which completes its life cycle in two hosts, a snail, sheep or man. It lives in the bile ducts of its hosts.

27. Write any two parasitic Adaptations is Flat worms.
(AJK. GI. 2015) (MLN. GI, DGK. GII. 2016) (FBD. GI, MLN. GI. 2017)

Ans. Two Parasitic Adaptations in Flatworms:

i. The complexity of life cycle and presence of more than one host during the life cycle is an important parasitic adaptation.

ii. Flatworms have developed adhesive organs, such as suckers and hooks, for attachment to the host.

28. Write down the scientific names of pin worm and hook worm. (SGD. GI. 2014)

Ans. Pin worm: Enterobius vermicularis

Hookworm: Ancylostoma duodenale

29. Name the excretory organs of phylum annelida and arthropoda. (FSD. GI. 2016)

Ans. Phylum Annelida: Excretory organ of annelids are Nephridia.

Phylum Arthropoda: Excretory organ of arthropods are Malpighian tubules.

30. Give beneficial effects of insects. (GRW. GI, 2014) (GRW. GII, DGK. GII, AJK. GI, 2015) (RWP. GII, 2017) (GRW. 2019)

Ans. Beneficial effects of Insects:

i. Honey bee provides man with honey and wax.
ii. Silk worm gives us silk.
iii. Insects larvae are source of food for fish.
iv. Some insect are predaceous on other harmful insects.

31. Give importance of Earthworm. (AJK. GI, 2016) (RWP. 2019)

Ans. Importance of Earthworm:

i. Burrowing activity of earthworms permits greater penetration of air into the soil, and improves drainage capacity of the soil.
ii. It also enables roots to grow downwards through the soil more easily.
iii. Mixing and churning of soil is brought about when earth which contains inorganic particles is brought up to the surface from lower regions.
iv. Earthworm is perhaps most active segmented worm in churning the soil, therefore, it is commonly termed as natural plough.

32. Write names and harms of any two harmful molluscs. (SGD. GI, 2014) (GRW. GII, 2015)

Ans. Harmful Molluscs: The harmful molluscs are slugs and shipworms.

i. Slugs are injurious to gardens and cultivations.
ii. Shipworms damage wooden parts of ships.

33. Write the names of four harmful insects. (SGD. GI, 2015) (SWL. GI, 2017) (MLN. GI, 2018)

Ans. Four Harmful Insects:

i. Locusts ii. Tse-tse fly iii. Lices iv. Bugs

34. What are harms caused by insects? (LHR. GII, 2016) (GRW. GI, 2017) (RWP. 2018) (MLN. GI, 2019)

Ans. Harmful effects of Insects:

i. Many types of mosquitoes, flies, fleas, lice and bugs transmit disease causing organisms to man and domestic animals.
ii. The common house fly carries disease causing organisms to contaminate food and cause cholera, hepatitis etc.
iii. Some species of Trypanosoma cause disease in cattle.
iv. A number of insects lay eggs on fruits and other commercial crops such as sugar-cane, maize, cotton and also on vegetable etc. The larvae of these insects damage fruits and the crops resulting in economic loss to farmers, e.g. Locusts.

35. How does transport of gases may take place in arthropods? (SWL. GI, 2017)

Ans. Most arthropods possess an extensive tracheal system for exchange of gases. This tracheal system is composed of air tubes called tracheae. Main tracheae open outside through openings called spiracles. Respiration in aquatic arthropods takes place through gills.

36. Define Water Vascular system in Echinoderms? (AJK. GI, 2016)

Ans. Water Vascular system in Echinoderms:

The most unique characteristics of echinoderms is that a water vascular system is present in their coelom. It is a complex system of tubes and spaces surrounding the mouth and passing into the arms and tube feet. The water circulates through these canals. Water enters these canals through a sieve like plate called madreporite present on the aboral body surface.

37. Name two larvae found in Echinoderms. (DGK. GII, 2017)

Ans. Reproduction: The sexes are separate and the fertilization is external. They develop larvae like bipinnaria larva and brachiolaria larva. These larvae have complex structures and they show bilateral symmetry. Their larvae resemble to the larvae of chordates.

38. Name two hemichordates. (LHR. GII, 2015)

Ans. Examples of hemichordates: i. Balanoglossus ii. Saccoglossus.

39. How are echinoderms related to hemichordates? (GRW. GI, 2015) (MLN. GI, 2017) (LHR. GII, A.JK. 2018)

Ans. Resemblance between echinoderms and hemichordates:

i. Both belong to series Deuterostomia.
ii. Both have same plan for formation of coelom and retention of blastopore as the site for future anus.
iii. Both possess mesodermal endoskeleton.
iv. Both have same origin of mesoderm form the cells close to blastopore.

40. Write down any four characteristics of class Osteichythes (Bony Fishes). (DGK. GI, 2017)

Ans. Four characteristics of Class Osteichythes (Bony fishes):

i. They have almost bony skeleton. It has replaced the cartilaginous skeleton.
ii. Small part of notochord may persist.
iii. Dermal scales are embedded in the skin. These scaled may be ganoid, cycloid or ctenoid. Placoid scales are absent in them.
iv. They have both unpaired (median) and paired fins. These fins have cartilaginous or bony fin rays.

41. What are hook worms? (DGK. GI, 2017)

Ans. Hook worm is a parasite of human small intestine. It is found in Asia, North Africa and Europe. It is a very dangerous parasite. It holds the villi of intestine and suck blood and body fluid. It produces an anticoagulant during feeding. This anticoagulant prevents the clotting of blood. It leaves the wound bleeding after feeding. It causes severe anaemia in children and retards the physical and mental growth.

42. What is coelomates? Give example. (DGK. GI, 2017)

Ans. The animals which possess coelom or true body cavity are called coelomates.

Examples: Animals from annelids to chordates are coelomates.

43. Differentiate between coelomates and acoelomates. (GRW. GI, BWP. GI, 2015) (DGK. GII, 2017) (LHR. GII, 2018)

Ans.

Coelomates	Acoelomates
i. Coelom is cavity present between the body wall and the alimentary canal and is lined by mesoderm. ii. The mesoderm splits into outer parietal layer and inner visceral layer.	i. Some triploblastic animals (Phylum Platyhelminthes) have no body cavity or coelom, and the mesoderm form loose, cellular tissue called mesenchyma or parenchyma.
iii. The parietal layer lines the body wall and the visceral layer covers the alimentary canal and the cavity between them is the true coelom.	ii. The parenchyma fills the space between the ectoderm and endoderm. iii. It forms a packing around the internal organs of the animals are protect them. Such animals are called acoelomate.
iv. The animals which possess coelom or true body cavity are called coelomates e.g. animals from annelids to chordates.	iv. In acoelomates the gut is sac type and there is no special transport system.

44. **What is haemocyanin?** (DGK. GI, 2015) (GRW. 2018)

Ans. Haemocyanin: Haemocyanin is a respiratory pigment. Haemocyanin is found in many species of molluscs and arthropods. Haemocyanins are blue copper containing protein and they do not have porphyrin or heeme group. When oxygen combines with copper the compounds become blue, as without oxygen haemocyanin is colourless.

45. **Give two beneficial roles of mollusca.** (GRW. 2018)

Ans. Two beneficial roles of mollusca:

i. **Source of food:** Many molluscs are great source of food for man in many parts of world. Large number of calms, oysters and mussels are eaten in Fareast (China, Japan and Malya), Europe and America. Oysters are knows for their delicacy.

ii. **Use in button Industry:** Shell of freshwater mussel is used in button industry.

46. **What is a radula?** (FBD. 2018)

Ans. Radula: In a mollusc, a rasp-like structure of tiny teeth is called radula. It is used for scraping food particles off a surface and drawing them into the mouth.

47. **What is the Notochord? Write down its function.** (MLN. GI. 2018)

Ans. Notochord: It is a rod like semi - rigid body of vacuolated cells are filled with proteinacoeus material.

Function: The primary purpose of notochord is to support and to stiffen the body that is to act as skeletal axis.

48. **How is the Spiral Cleavage different from Radial Cleavage?** (MLN. GII, SGD, DGK. GII, BWP. 2018)

Ans. A spiral cleavage is that in which the lines or planes of cleavage are not symmetrical between poles instead there are diagonal (oblique or sloping) to the polar axis.

While in radial cleavage the planes of cleavage are symmetrical to the polar axis.

49. **What are triploblastic animals?** (DGK. GI. 2018)

Ans. Triploblastic Animals: The animals whose body is composed of three layers ectoderm, mesoderm and endoderm are called triploblastic animals. There animals show bilateral symmetry.

Example: All animals from flatworms to humans are triploblastic animals.

50. **Name any two beneficial insects.** (DGK. GI, 2018)

Ans. Two Beneficial Insects:

i. Honey Bee ii. Silkworm

51. **What are pseudocoelomates and coelomates?** (DGK. GII, 2018) (SWL. 2019)

Ans. Pseudocoelomate: The animals having the space between the body wall and the digestive tube (pseudocoelom) are called pseudocoelomates.

Example: Aschelminthes (nematoda)

Coelomates: The animals which possess coelom or true body are called coelomates.

Example: Animals from annelids to chordates.

52. **Name any two Larvae found in Echinoderms.** (BWP. 2019)

Ans. Two Larvae found in Echinoderms:

i. Bipinnaria ii. Brachiolaria

53. **What is blastostyle?** (LHR. GII, 2019)

Ans. **Blastostyle:** In coelenterates reproduction takes place by asexual as well as sexual mean. Hydra reproduce asexually by the formation of buds on its surface. The bud after some time separate from the parent and develop a new individual. In Obelia for example there asexual as well as sexual reproduction. It has a kind of zooid known as blastostyle which gives rise to individual zooids called medusae by asexual method. The medusae when released in water develop reproductive organs which produce gametes that unite to form zygote from which obelia colony is again formed.

54. **How madrepora is important?** (LHR. GII, 2019)

Ans. **Madrepora:** The body is covered with hard calcareous skeleton formed of calcium carbonate. They are commonly called corals. The skeleton form large coral reefs and even small islands.

55. **Name three classes of phylum Annelida.** (FBD. GI, 2019)

Ans. **Three classes of phylum Annelida:**

i. Class Polychaeta ii. Class Oligochaeta iii. Class Hirudinea

56. **What are paraphyses and protonema?** (FBD. GI, 2019)

Ans. **Paraphyses:** The archegonia and antheridia form clusters and are mixed with sterile hair called Paraphyses.

Protonema: The spores of a moss unlike that of liverworts develop into an alga like structure protonema.

57. **Give two common characters of Annelids and Arthropods.** (MLN. GI, 2019)

Ans. **Two common characters of Annelids and Arthropods:**

i. Both are segmented and members of the annelids class Polychaeta have a pair appendages on each segment.

ii. Animals possess a body plan with repeating segments of identical or similar structures.

58. **What is honey dew?** (MLN. GII, 2019)

Ans. **Honey Dew:** The composition off materials flowing in phloem has been studied by using aphids. The insects which are phloem feeders. These insects insert their stylets into stem are leaf and extend them to puncture a seive tube. The pressure in the ceive tube cell forces sap through aphid's digestive tract and out its posterior end as droplets called honey dew.

59. **Give some affinities of Echinoderms with hemichordates.** (RWP. 2019)

Ans. **Affinities:** Echinodermata do not show close relationship to most vertebrates but they do show affinities with hemichordate.

i. Formation of coelom is some in both.

ii. Blastopore is the site of future anus.

iii. Endoskeleton is mesodermal and exoskeleton is ectodermal in origin in both.

ESSAY TYPE QUESTIONS

No Long Question has been taken from this chapter.

****

CHAPTER 11

Bioenergetics

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. The break down of terminal phosphate of ATP releases energy about: (LHR. GI, SWL. GI, 2014) (RWP. RWP. 20…
   (A) 7.0 k cals **(B)** 7.3 k cals (C) 7.5 k cals (D) 8.1 k cals
2. Chlorophyll a is found in all photosynthetic organisms except: (LHR. GII, 20…
   (A) Diatoms (B) Red algae **(C)** Bacteria (D) Euglena
3. Chlorophyll absorbs mainly wavelengths of: (LHR. GI, 20…
   (A) Green color (B) Yellow color (C) Indigo color **(D)** Violet-blue color
4. Quantitative study of energy relationship in biological system is called: (LHR. GI, GRW. GI, 2014) (GRW. GII, LHR. GII, 20…
   (A) Bioenergetics (B) Biosynthesis (C) Biodegradation (D) Biotechnology
5. Important source of atmospheric oxygen, released during photosynthesis is from: (LHR. GI, MLN. GI, 2014) (LHR. GII, 20…
   (A) Water (B) Carbon Dioxide (C) Nitrates (D) Glucose
6. In mitochondria, the pumping of proton (Chemiosmosis) is across the: (LHR. GI, 20…
   (A) Outer membrane **(B)** Inner membrane
   (C) Matrix (D) Inter membraneous space
7. Light wavelength least absorbed by chlorophylls is: (LHR. GI, 20…
   (A) Violet (B) Blue **(C)** Yellow (D) Orange
8. A kind of chemical link between anabolism and catabolism: (FSD. GI, 2015) (RWP. GI, 2017) (DGK. 20…
   (A) Protein (B) Glucose **(C)** ATP (D) None of These
9. The maximum absorption peaks of length are: (LHR. GII, 20…
   (A) 450, 640 (B) 440, 490 **(C)** 430, 670 (D) 550, 650
10. The process by which pH gradient across membrane drives of formation of ATP is called: (LHR. GI, 2014) (GRW. 20…
    (A) Photosynthesis **(B)** Chemiosmosis (C) Photorespiration (D) Calvin cycle
11. The percentage of photosynthesis carried out by terrestrial plants is about: (DGK. GII, 2016) (RWP. GI, 20…
    (A) 10 (B) 20 (C) 30 (D) 40
12. The first action spectrum was obtained by biologist T.W Engelmann in: (LHR. GII, 20…
    (A) 1883 (B) 1938 (C) 1898 (D) 1876
13. In yeast, the products of anaerobic respiration are: (GRW. GI, 20…
    (A) Methyl alcohol **(B)** Ethyl alcohol (C) Lactic acid (D) Pyruvic acid
14. Enzymes involved in cellular respiration are found in: (GRW. GII, 2…
    (A) Cytoplasm (B) Golgi bodies
    (C) Mitochondria (D) Endoplasmic Reticulum
15. Magnesium of chlorophyll is replaced in hemoglobin by: (SWL. GI, 2…
    (A) Calcium (B) Potassium **(C)** Iron (D) Phosphorus

16. **Energy poor inorganic oxidized compounds are reduced to energy rich carbohydrates during:** (LHR. GI, 2017)
(A) Respiration **(B) Photosynthesis** (C) Development (D) Growth

17. **Glycolysis is the breakdown of glucose up to the formation of:** (GRW. GII, 2016)
(A) Pyruvic acid (B) Sulphuric acid (C) ATP (D) NAD

18. **Thylakoid membranes are involved in ATP synthesis by a process known as:** (LHR. GI, 2017) (LHR. GII, 2016)
(A) Glycolysis (B) Dark reaction **(C) Chemiosmosis** (D) Photolysis

19. **The hypothesis that plants split water as a source of hydrogen was given by:** (LHR. GI, 2017)
(A) Van Niel (B) Kreb (C) Calvin (D) Pasteur

20. **Haeme portion of haemoglobin contains:** (RWP. GI, 2014) (MLN. GI, 2016) (LHR. GII, 2016) (... GI, 2015)
(A) Mg^{++} **(B) Fe^{++}** (C) Fe^{+++} (D) Ca^{++}

21. **The moment in plants when carbon dioxide released by respiration equal the quantity required by photosynthesis is termed as:** (SWL. GI, 2017)
(A) Compensation point (B) Homeostasis (C) Chemiosmosis (D) Action spectrum

22. **One of the a accessory photosynthetic pigments carotenes are mostly:** (RWP. GI, 2014)
(A) Red to Orange (B) Yellow to Orange (C) Green to Yellow (D) Orange to Red

23. **Haem portion of hemoglobin contains an atom of:** (MLN. GI, 2014) (RWP. GI, 2015)
(A) Magnesium **(B) Iron** (C) Phosphorus (D) Calcium

24. **Glycolysis is the break down of:** (RWP. GII, 2014)
(A) Sucrose (B) Lactose **(C) Glucose** (D) Maltose

25. **The only photosynthesizing cells of epidermis of leaf are:** (RWP. GI, 2015)
(A) Cortex cells (B) Mesophyll cells **(C) Guard cells** (D) Xylem cells

26. **The carotene are mostly red in:** (RWP. GII, 2015)
(A) Blue (B) Yellow **(C) Orange** (D) Green

27. **Accessory photosynthetic pigments xanthophylls are:** (SGD. GII, 2015)
(A) Green in Colour (B) Red in Colour **(C) Yellow in Colour** (D) Calcium

28. **Molecular formula for chlorophyll "b" is:** (MLN. GI, 2015)
(A) $C_{55} H_{72} O_5 N_4 Mg$ **(B) $C_{55} H_{70} O_6 N_4 Mg$**
(C) $C_{55} H_{70} O_5 N_4 Mg$ (D) $C_{54} H_{52} O_6 N_6 Mg$

29. **Chlorophyll molecule contains except:** (DGK. GII, 2015)
(A) Porpyrin ring (B) Phytol tail (C) Magnesium **(D) Iron**

30. **Photosynthetic pigments are the substances that absorb visible light having wave length:** (AJK. GI, 2015)
(A) 150-340nm (B) 230-450nm **(C) 380-750nm** (D) 350-780nm

31. **The area of Leaf surface covered by stomate is only:** (SGD. GI, 2015)
(A) 2 – 4% (B) 2 – 3% **(C) 1 – 2%** (D) 1 – 3%

32. **Chlorophylls are insoluble in:** (DGK. GI, 2016)
(A) Alcohol (B) Acetone **(C) Water** (D) Carbon tetrachloride

33. **Haem portion of hemoglobin is same to porphyrin ring with a difference of:** (RWP. GI, 2016)
(A) Carbon atom (B) Hydrogen atom **(C) Iron atom** (D) Oxygen atom

34. **The water splitting up of photosynthesis that releases oxygen is called:** (FBD. GI, 2014)
(A) Electron Transport Chain **(B) Photolysis**
(C) Chemiosmosis (D) Dark reaction

35. **The breaking of terminal phosphate of ATP release about 7.3 k.cals of:** (FBD. GII, 2016)
(A) O_2 (B) NO_2 (C) Heat **(D) Energy**

36. **Photosynthetic pigments organized into clusters are called:** (SWL. GI, 2017)
(A) Thylakoids **(B) Photosystems** (C) Granna (D) Stroma

37. **During respiratory chain Coenzyme Q is oxidized by:** (FBD. GI, 2014)
(A) Cytochrome a **(B) Cytochrome b** (C) Cytochrome c (D) Cytochrome a3

38. **The final product of glycolysis is:** (FBD. GII, 2018)
(A) Citrate **(B) Pyruvate** (C) Malate (D) Fumarate

39. **The first action spectrum was obtained by:** (RWP. GI, 2015) (SWL. 2018)
(A) T.W. Engelmann (B) Van Neil (C) Melvin Calvin (D) Ernst Haeckel

40. **Conversion of one pyruvic acid into one acetyl Co-A gives off one molecule of:** (FBD. GI, 2016)
(A) Citrate (B) Pyruvate **(C) NADH** (D) ATP

41. **Carbon dioxide enters the leaves through:** (DGK. GI, 2015)
(A) Epidermis (B) Cuticle (C) Air spaces **(D) Stomata**

42. **Daily rhythmic opening and closing of stomata is:** (DGK. GI, 2015)
(A) Internal clock (B) External Clock
(C) Both Internal and External (D) None of them

43. **Absorption of blue light is maximum at:** (GRW. GII, 2016)
(A) 430 nm (B) 380 nm (C) 750 nm (D) 670 nm

44. **A great deal of energy is released during:** (MLN. GII, DGK. GI, 2015)
(A) Respiration (B) Reproduction (C) Photosynthesis (D) Excretion

45. **Which one is not the phase of Calvin cycle?** (GRW. GII, 2014)
(A) Carbon Fixation (B) Reduction
(C) regeneration of CO_2 acceptor (D) Phosphorylation

46. **A graph plotting absorption of light of different wavelengths by a pigment is called:** (MLN. 2014)
(A) Action spectrum **(B) Absorption spectrum**
(C) Visible spectrum (D) Frequency histogram

47. **The dark reaction for photosynthesis occurs in:** (SWL. GI, 2014) (SGD. GI, 2016) (FBD. GI, RWP. GI, 2017) (SGD. 2018) (SGD. 2019)
(A) Cytoplasm (B) Chloroplast **(C) Stroma** (D) Grana

48. **In the first step of citric acid cycle acetyle-Co-A reacts with oxaloacetate to form:** (RWP. GI, AJK. GI, 2017) (MLN. GI & GII, 2018) (LHR. GII, DGK. 2019)
(A) Pyruvate **(B) Citrate** (C) NADH (D) ATP

49. **An instrument that measures the relative ability of different pigments to absorb different wave lengths of light is called:** (DGK. GI, 2014)
(A) Electrocardiogram (B) Photometer
(C) Potometer **(D) Spectrophotometer**

50. **All life on planet earth is powered by:** (DGK. 2014) (DGK. 2017)
(A) Chemical energy **(B)** Solar energy
(C) Electrical energy (D) Atomic energy

51. **Formula of Lactic acid is:** (LHR. GI, 2017)
(A) $C_3H_4O_3$ (B) $C_3H_8O_3$ **(C)** $C_3H_6O_3$ (D) C_2H_5OH

52. **The amount of energy present within the chemical bonds of glucose is converted into ATP during anaerobic respiration is:** (SWL. GI, 2016) (GRW. GI, 2017)
(A) 1% **(B)** 2% (C) 3% (D) 4%

53. **Pyruvic acid is produced as a result of:** (RWP. GI, 2015) (MLN. GI, AJK. GI, 2016) (SWL. 2018) (GRW. 2019)
(A) Krebs cycle **(B)** Glycolysis (C) Phosphorylation (D) Respiratory chain

54. **In respiratory chain, NADH is oxidized by:** (DGK. GII, 2015) (DGK. GII, 2016)
(A) Co-factor **(B)** Coenzyme (C) Cytochrome "b" (D) Cytochrome "a"

55. **The electron transport chain system play role in generation of ATP by:** (LHR. GI, 2016)
(A) Photosynthesis **(B)** Chemiosmosis (C) Photosynthesis (D) Dark reaction

56. **Photosyntem II has the form of chlorophyll a which absorbs best light of:** (FBD. 2018)
(A) 670 nm **(B)** 680 nm (C) 690 nm (D) 700 nm

57. **Chlorophyll "a" of photosystem I absorbs maximum light of:** (MLN. GII, 2019)
(A) 670 nm (B) 680 nm (C) 690 nm **(D)** 700 nm

58. **Which is stimulus for cyclic phosphorylation?** (MLN. GII, 2019)
(A) Low CO_2 (B) Low O_2 **(C)** Low ATP (D) Low NADPH

SHORT ANSWER QUESTIONS

1. **What is meant by Bacteriochlorophylls?** (LHR. GI, 2014) (SGD. 2018)

Ans. Bactriochlorophylls: Bactriochlorophylls are kinds of chlorophylls found in photosynthetic bacteria.

2. **What do you know about Rubisco? Write down its function.** (LHR. GII, 2015) (SWL., AJK. 2018)

Ans. Rubisco: Rubisco is abbreviated form of Ribulose Bisphosphate carboxylase/oxygenase. It is the most abundant protein in chloroplasts, and probably the most abundant protein on earth.

Function of Rubisco: Rubisco is used in the first phase of calvin cycle to catalyze the first major step of carbon fixation.

3. **Define bioenergetics.** (FBD. GI, DGK. GI, 2015) (SGD. GI & GII, 2016) (SWL. GI, 2017) (SGD. 2018)

Ans. Bioenergetics: Bioenergetics is the quantitative study of energy relationships and energy conversions in biological systems.

4. **Give any two differences between photosynthesis and respiration.** (GRW. GI, 2014) (GRW. GII, 2015) (SGD. 2019)

Ans.

Photosynthesis	Respiration
i. Photosynthesis is an energy-capturing process.	i. Respiration is an energy releasing process.
ii. Photosynthetic is an anabolic process.	ii. Respiration is a catabolic process.

5. **Point out the role of Mitochondria in respiration.** (LHR. GII. 2016)

Ans. Role of Mitochondria In Respiration: Mitochondria are the organelles that are the sites of aerobic respiration, an oxygen requiring process that includes most of the reaction that convert the chemical energy present in certain foods to ATP.

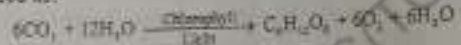
6. **Name the process which act as Energy capturing and energy Releasing.** (LHR. GI. 2016)

Ans. Photosynthesis is a process which acts as energy capturing and energy releasing.

7. **Define photosynthesis. Give its summary equation.** (LHR. GI, GRW. GII. 2015) (DGK. GII. 2016) (LHR. GI. 2017) (FBD. 2018) (GRW. 2018)

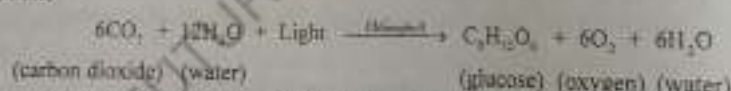
Ans. Photosynthesis: Photosynthesis can be defined as: "The process in which energy-poor inorganic oxidized compounds of carbon (i.e., CO_2) and hydrogen (i.e., mainly water) are reduced to energy-rich carbohydrates (i.e., sugar-glucose) using the light energy that is absorbed and converted into chemical energy by chlorophyll and some other photosynthetic pigments.

Summarized equation of photosynthesis: The process of photosynthesis in green plants can be summarized as:

$$6CO_2 + 12H_2O \xrightarrow[\text{Light}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

8. **What is compensation point? Where it occurs?**
(SWL. GI. 2014) (MLN. GI, SGD. GII. BWP. 2015) (GRW. GI, BWP. GI. 2016) (FBD. GI, SWL. GI. 2017) (DGK. GII. 2018) (FBD. GII, MLN. GI. 2018)

Ans. Compensation Point: Compensation point is a short time at which there is no net gas exchange between the leaves and the atmosphere.

Occurrence of Compensation Point: Compensation point occurs at dawn and dusk, when light intensity is low, the rate of photosynthesis and respiration may equal one another.

$$\underset{\text{(carbon dioxide)}}{6CO_2} + \underset{\text{(water)}}{12H_2O} + \text{Light} \xrightarrow{\text{Chlorophyll}} \underset{\text{(glucose)}}{C_6H_{12}O_6} + \underset{\text{(oxygen)}}{6O_2} + \underset{\text{(water)}}{6H_2O}$$

9. **What are the main parts of a chlorophyll molecule and what is Porphyrin Ring?** (DGK. GII. 2016)

Ans. Main Parts of Chlorophyll Molecule: Chlorophyll molecule has two main parts which are head and tail.

Porphyrin Ring: Head, a part of chlorophyll contains porphyrin ring. It is made up of four joined smaller pyrrol rings composed of carbon and nitrogen atoms. An atom of magnesium is present in the centre of porphyrin ring and is coordinated with the nitrogen of each pyrrole ring.

10. **What are aerobic and anaerobic respiration?** (RWP. GI. 2016) (GRW. GI. 2017)

Ans. Aerobic Respiration: Respiration that occurs in the presence of oxygen is called aerobic respiration.

Anaerobic Respiration: Respiration that occurs in the absence of oxygen is called anaerobic respiration.

11. **What is the product of light reactions?** (MLN. GI. 2015)

Ans. Product of Light Reactions: The products of light reaction are:
O_2, ATP and NADPH + H^+

12. What is meant by preparatory and oxidative phase of Glycolysis? (MLN. GII, 2016)

Ans. Preparatory Phase of Glycolysis: During preparatory phase of glycolysis phosphates are added from ATP and ultimately the 6-carbon sugar is split into two 3-carbon compounds.

Oxidative Phase: During the oxidative phase of glycolysis NAD+ accepts electrons and hydrogen to form NADH and high energy phosphate bonds are formed and energy is stored in the form of ATP.

13. What is stroma? Give its function. (MLN. GI, 2015)

Ans. Stroma: Stroma is the matrix that surrounds the grana within a chloroplast.

Function of Stroma: Stroma contains enzyme used in photosynthesis. Dark reaction takes place is stroma.

14. Write down the molecular formula for chlorophyll "a" and "b". (LHR. GI, 2019)
(MLN. GI, 2014) (FBD. GI, DGK. GI & GII, 2015) (FBD. GI, 2016) (DGK. GII, 2018)

Ans. Chlorophyll a: $C_{55}H_{72}O_5N_4Mg$. **Chlorophyll b:** $C_{55}H_{70}O_6N_4Mg$

15. What is the End Product of Anaerobic Respiration in Human? (MLN. GI, 2014)

Ans. The End product of Anaerobic Respiration in human is Lactic Acid.

16. How chlorophyll "a" differs with chlorophyll "b"? (BWP. GI, 2014) (BWP. 2018) (LHR. GII, SGD. 2019)

Ans. Difference between chlorophyll a and chlorophyll b:

Chlorophyll a and chlorophyll b differ from each other in only one of the functional groups bonded to the porphyrin; the methyl group ($-CH_3$) in chlorophyll a is replaced by a terminal carbonyl group ($-CHO$) in chlorophyll b.

17. What are accessory pigments in plants? Give their functions.
(LHR. GI & GII, SGD. GI, 2015) (GRW. GI, 2016)
(DGK. GI & GII, 2017) (MLN. GII, 2018) (FBD. GII, MLN. GI, 2019)

Ans. Accessory Photosynthetic Pigments: Accessory photosynthetic pigments absorb light of different wave length other than the chlorophyll absorb. So they broaden the spectrum of light that provides energy for photosynthesis.

Function of accessory pigments: Following are the functions of accessory pigments

i. Accessory pigments absorb light and transfer the energy to chlorophyll a, which then initiate the light reaction.

ii. Some carotenoids protect chlorophyll from intense light by absorbing and dissipating excessive light energy, rather than transferring energy to chlorophyll. Examples: Carotenoids are yellow and red to orange pigments that absorbs blue to violet range of light colours.

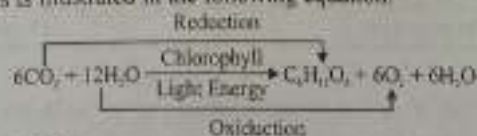
18. Why photosynthesis is called Redox Process? Illustrate with equation. (BWP. GII, 2014)

Ans. Photosynthesis is called Redox process because in this process, CO_2 is reduced and water is oxidized.

Illustration: This is illustrated in the following equation.

Reduction

$$6CO_2 + 12H_2O \xrightarrow[\text{Light Energy}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

Oxiduction

19. What are Thylakoids? (BWP. GI, 2016)

Ans. Thylakoids: Thylakoids are thin flattened membranous sacs in the stroma of chloroplast which contain chlorophylls, accessory pigments and electron transport molecules.

20. **Differentiate between absorption and action spectrum?** (RWP. GI, 2015) (GRW. GI, 2016) (FBD. GI, RWP. GI, 2017) (MLN. GI, AJK. 2018) (SWL. 2019)

Ans.

Absorption Spectrum	Action Spectrum
The region of the spectrum of electromagnetic energy (usually visible light) that is absorbed by a particular photosynthetic pigment.	The region of the spectrum of electromagnetic energy that shows effectiveness of different wavelengths in driving photosynthesis.

21. **How action spectra can be obtained?** (LHR. GI, SGD. GI, 2016)

Ans. Action Spectrum: Action spectrum can be obtained by illuminating plant with light of different wavelengths (or colours) and then estimating relative CO_2, consumption on oxygen release during photosynthesis.

22. **Give the function of phytol tail in chlorophyll molecule.** (RWP. GII, 2018)

Ans. Function of Phytol Tail In Chlorophyll Molecule: The function of phytol tail in chlorophyll molecule is to embed the molecule in the hydrophobic core of thylakoid membrane.

23. **How NAD and ATP can inhibit cellular respiration?** (SGD. GI, 2017)

Ans. NAD Inhibiting Cellular Respiration: When large quantity of NAD is formed, it inhibits the production of an enzyme pyruvate decarboxylase that catalysis the pyruvic oxidation, hence stopping the cellular respiration.

ATP Inhibiting Cellular Respiration: A large quantity of ATP inhibits the production of enzyme phosphofructokinase enzyme that catalysis the conversion of Fructose-6-phosphate into fructose 1-6- diphosphate stopping the cellular respiration.

24. **Give the function of spectrophotometer.** (LHR. GII, DGK. GII, 2017) (FBD. GI, 2019)

Ans. Spectrophotometer is used for the measurement of relative abilities of different pigments to absorb different lights. A graph plotting absorption of light of different wave lengths by a pigment is called absorption spectrum of the pigment.

25. **How is carbon dioxide absorbed by the cell wall of the mesophyll cells?** (LHR. GII, 2014)

Ans. Carbon dioxide enters the leaves through stomata and gets dissolved in the water absorbed by the cell walls of mesophyll cells.

26. **Name the most common fuel used by the cell to provide energy by cellular respiration.** (SWL. GI, 2015)

Ans. ATP is the most common fuel used by the cell to provide energy by cellular respiration.

27. **What type of reactions take place during preparatory phase of glycolysis?** (DGK. GII, 2012)

Ans. During preparatory phase of glycolysis phosphates are added from ATP and ultimately the 6-carbon sugar is split into two 3-carbon compounds.

28. **Differentiate between photosystem I and photosystem II.** (FBD. GI, 2014) (AJK.GI, 2015)

Ans.

Photosystem I	Photosystem II
i. Photosystem I has chlorophyll a molecule which absorb maximum light of 700 nm is called P_{700}.	i. Photosystem II Has chlorophyll a molecule which absorbs maximum light of 680 nm is called P_{680}.
ii. Photosystem I is involved in both non-cyclic and cyclic phosphorylation.	ii. Photosystem II is involved only in non-cyclic phosphorylation.

29. **What is Z- scheme?** (LHR. GI. 2014) (DGK. GI. 2015) (RWP. GI. 2017) (LHR. GI. 2018)

Ans. Z-Scheme: The path of electrons through the photo system II and I during non-cyclic photophosphorylation is known as Z-scheme from its shape.

30. **Differentiate between non cyclic electron flow with cyclic electron flow.** (SGD. GII. 2017)

Ans.

Non cyclic Electron Flow	Cyclic Electron Flow
Non cyclic electron flow involves both PS-II and PS-I. In non-cyclic electron flow, ATP, NADPH and oxygen are generated.	Cyclic electron flow involves PS-I only. In cyclic electron flow, only ATP is generated. There is no production of NADPH and no release of oxygen.

31. **What are photosystems? Give their types.** (FBD. GI. SWL. GI. 2016)

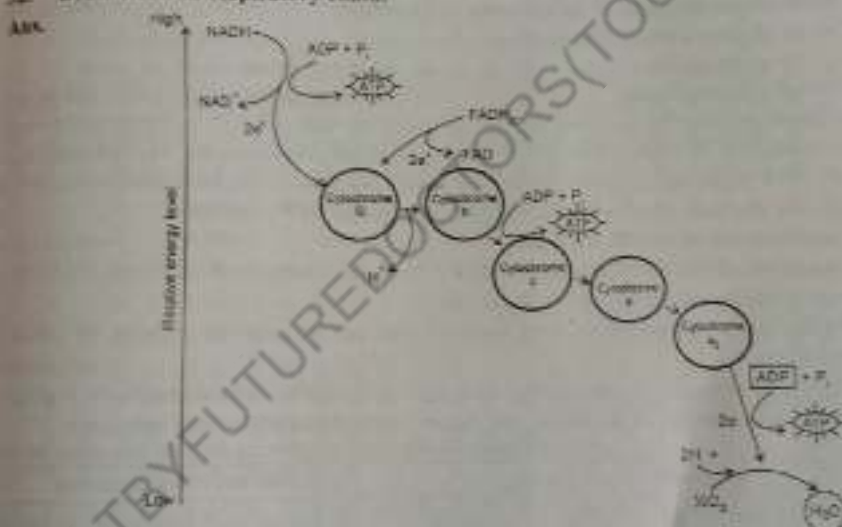
Ans. Photosystems: Photosynthetic pigments are organized into clusters called photosystems for efficient absorption and utilization of solar energy in thylakoid membranes.

Types of Photosystems:

i. Photosystem I (PS-I) ii. Photosystem II (PS-II)

The two basic molecular systems for converting light chemical energy during photosynthesis, photosystem I tends to absorb light with a wavelength near 700nm. Photosystem II most strongly absorb light with wavelength near 680 nm.

32. **Draw electron respiratory chain.** (DGK. GII. 2014)

Ans.

33. **Write about pyruvic acid oxidation.** (AJK. GII. 2014)

Ans. Pyruvic Acid Oxidation: Pyruvic acid (Pyruvate), the end product of glycolysis, does not enter the Krebs cycle directly. The Pyruvate (3-carbon molecule) is first change into 2-carbon acetic acid molecule. One carbon is released as CO_2 (decarboxylation). Acetic acid on entering the mitochondrion unites with coenzyme A (CoA) to form acetyle CoA (active acetate). In addition, more hydrogen atoms are transferred to NAD.

34. **What is chlorosis?** (LHR. GI. 2015)

Ans. Chlorosis: Deficiency of chlorophyll is called chlorosis. It is caused due to deficiency of magnesium.

35. Differentiate between photolysis and photophosphorylation. (DGK. GII, 2016) (MLN. GI, 2017)

Ans.

Photolysis	Photophosphorylation
The splitting of water molecule by an enzyme during photosynthesis is called photolysis of water. In photolysis, water molecules split into two hydrogen ions and an oxygen atom, which immediately combines with another oxygen atom to form O_2. This oxygen is the main source of replenishment of atmospheric oxygen.	The production of ATP through the transport of electron excited by light energy down an electron transport chain. Photophosphorylation is of two types in photosynthesis as follows: Non-cyclic photophosphorylation Cyclic Photophosphorylation. This ATP generated by light reactions will provide chemical energy for the synthesis of sugar during the Calvin cycle, the second major stage of photosynthesis.

36. What is photolysis? In which system does it take place? (SGD. GI, 2016) (BWP. GI, 2017)

Ans. Photolysis: Photolysis splits a water molecule into two hydrogen ions and an oxygen atom, which immediately combines with another oxygen atom to form O_2.

Photolysis takes place in non-cyclic phosphorylation of light reaction in photosynthesis with the help of enzyme.

The electrons which are extracted during photolysis of water fills the hole of photosystem II and oxygen produced is the main source of replenishment of atmospheric oxygen.

37. Write down the name of main phases of Glycolysis. (DGK. GI, 2016)

Ans. Name of main phases of Glycolysis:

i. Preparatory phase

ii. Oxidative phase

38. Define Chemiosmosis. (GRW. GI, MLN. GII, 2017) (DGK. GI, 2018) (LHR. GI, 2019)

Ans. Chemiosmosis: The coupling reaction in which synthesis of ATP molecule takes during movement of H^+ across and an H^+ gradient is called chemiosmosis. The mechanism for the ATP synthesis is chemiosmosis in cyclic and non-cyclic phosphorylation. It is a process that uses membranes during redox reaction for ATP production.

39. Give function of NADP reductase. (GRW. GI, 2014)

Ans. Function of NADP Reductase: NADP reductase reduces NADP into NADPH in non-cyclic phosphorylation of light reaction.

40. Name the most common fuel used by the cell to provide energy by cellular respiration. (SWL. GI, 2014)

Ans. The most common fuel used by the cell to provide energy by cellular respiration is glucose.

41. Differentiate between Alcoholic and Lactic acid fermentation with reactions. (LHR. GII, GRW. GI, 2015) (SWL. GI, MLN. GI, BWP. GI, 2016) (MLN. GII, 2018)

Ans.

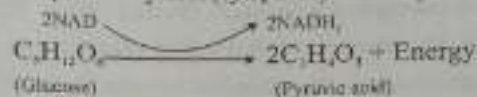
Alcoholic Fermentation	Lactic acid Fermentation
i. In alcoholic fermentation, pyruvic acid is broken-down into ethyl alcohol and CO_2.	i. In Lactic acid fermentation pyruvic acid is converted into lactic acid.
Chemical Reaction: $2NADH_2 \longrightarrow 2NAD$	**Chemical Reaction:** $2NADH_2 \longrightarrow 2NAD$
ii. $2(C_3H_4O_3) \longrightarrow 2(C_2H_5OH) + 2CO_2$ (Pyruvic acid → Ethyl Alcohol)	ii. $2(C_3H_4O_3) \longrightarrow 2(C_3H_6O_3)$ (Pyruvic acid → Lactic acid)
Example: Alcoholic fermentation takes place in primitive prokaryotic cells and in some eukaryotic cells such as yeast.	**Example:** Lactic acid fermentation occurs in muscle cells of humans and other animals during extreme physical activities such as sprinting.

42. What is meant by anaerobic respiration? Give an example. (RWP. GI, SGD. GI, 2015) (AJK. GI, 2016) (MLN. GII, 2017)

Ans. Anaerobic Respiration: Incomplete breakdown of glucose in the absence of air is known as anaerobic respiration or fermentation.

43. What is Glycolysis? Where it takes place in the cell? (LHR. GI, GRW. GII, 2016) (LHR. GII, 2017)

Ans. Glycolysis: Glycolysis is the first phase of energy metabolism in cells. By way of the glycolysis pathway, a single six-carbon glucose molecule is converted into two molecules of the three-carbon compound, pyruvate, two molecules of NADH, and two molecules of ATP. Glycolysis takes place in cytosol (cytoplasm) and is represented by the equation.

$$\underset{\text{(Glucose)}}{C_6H_{12}O_6} \xrightarrow{2NAD \rightarrow 2NADH_2} \underset{\text{(Pyruvic acid)}}{2C_3H_4O_3} + \text{Energy}$$

44. What is importance of ATP? (SGD. GII, 2016)

Ans. Importance of ATP:

i. Adenosine triphosphate, generally abbreviated as "ATP" is a compound found in every living cell and is one of the essential chemicals of life. It plays the key role, in 4 most biological energy transformation.

ii. The ATP molecule is used by cells as a source of energy for various functions for examples, synthesis of more complex compounds, active transport across the cell membrane, muscular contraction and nerve conduction etc.

45. Differentiate between Aerobic and Anaerobic respiration? (GRW. GII, 2017) (RWP. 2019)

Ans.

Aerobic respiration	Anaerobic respiration
i. It is the type of respiration in which oxygen is the final electron acceptor.	i. It is the type of respiration which does not require oxygen as its final electron acceptor.
ii. Glucose is completely oxidized.	ii. Glucose is incompletely oxidized.
iii. 36 ATP molecules per glucose molecule are produced and the energy released from these is equivalent to 363 Kcal.	iii. Two ATP molecules per glucose molecule are produced and the energy released from these is equivalent to 14.6 kcal.
iv. End products are CO_2 and H_2O.	iv. End products are CO_2 and alcohol or lactic acid.

46. What is External respiration? (DGK. GI, 2016)

Ans. External Respiration: External respiration means the exchange of respiratory gases (CO_2 and O_2) between the organism and its environment. External respiration is also known as breathing in Humans.

47. What is meant by internal respiration? (MLN. GI, 201

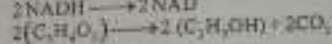
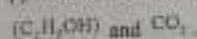
Ans. The step by step breakdown of the C-chain molecules and the release of energy within the cell are called cellular respiration. It occurs inside the cell. ATP is produced directly in the process. In this process oxygen is utilized and CO_2 is released.

48. What are carotenoids? (DGK. GII, 2017) (DGK. GI, 201

Ans. Carotenoids: Carotenoids are yellow, red and orange accessory pigments which absorb mostly blue violet range. They broaden the spectrum of light that provides energy for photosynthesis.

49. Define alcoholic fermentation. Write its equation. (LHR. GI, 2018) (AJK. 2019)

Ans. Alcoholic Fermentation: In primitive cells and in some eukaryotic cells such as yeast, pyruvic acid is further broken down by alcoholic fermentation into alcohol (C_2H_5OH) and CO_2.

$$2NADH \longrightarrow 2NAD$$
$$2(C_3H_4O_3) \longrightarrow 2(C_2H_5OH) + 2CO_2$$

Puruvic acid Alcohol

50. What is a porphyrin ring of a chlorophyll molecule? (GRW. 2018) (SWL. 2019)

Ans. Porphyrin ring of chlorophyll molecule: The flat, square, light-absorbing hydrophilic head of structure of chlorophyll molecule is called porphyrin ring. It is made up of 4 joined smaller pyrrole rings composed of carbon and nitrogen atoms. An atom of magnesium is present in the centre of porphyrin ring and is coordinated with the nitrogen of each pyrrole ring.

51. What are cytochromes? (GRW. 2018)

Ans. Cytochromes: Cytochromes are electron transport intermediates containing haeme or related prosthetic groups that undergo valency changes of iron atom. Three varities of cytochromes are recognized, cytochrome a, cytochrome b and cytochrome c.

52. How it was proved that oxygen released during photosynthesis comes from water and not from CO_2? (FBD. 2018)

Ans. Oxygen released during photosynthesis comes from water. Water is an important source of atmospheric oxygen which most organisms need for aerobic respiration and thus for obtaining energy to live.

53. Write down phases of aerobic cellular respiration. (MLN. GI, 2018)

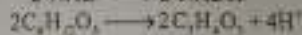
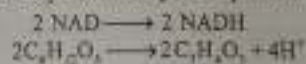
Ans. Phases of Aerobic Cellular Respiration:

i. Respiration that occurs in the presence of oxygen is called aerobic respiration.

ii. The most common fuel used by the cell to provide energy by cellular respiration is glucose. The way glucose metabolized depends on the availability of oxygen.

iii. Prior to entering a mitochondrion the glucose molecule is split to form two molecules of pyruvic acid.

iv. This reaction is called glycolysis (glycolysis literally means splitting of surgar) and occurs in the cytosol and is represented by the equation.

$$2\,NAD \longrightarrow 2\,NADH$$
$$2C_6H_{12}O_6 \longrightarrow 2C_3H_4O_3 + 4H^+$$

Pyruvic acid Energy

v. Cell processes pyruvic acid in three major ways, alcoholic fermentation, lactic acid fermentation and aerobic respiration.

vi. The first two reactions occur in the absence of oxygen and are referred as an anaerobic (with out oxygen).

vii. The complete breakdown of glucose molecule occurs only in the presences of oxygen i.e.., in aerobic respiration.

During aerobic respiration glucose is oxidized to CO_2 and water and energy is released.

54. **What are the products of light reaction of photosynthesis?** (RWP, 2019)

Ans. Products of Light Reaction of Photosynthesis:

The products of light reaction of photosynthesis are:

☆ NADPH, ($NADPH + H^+$) ☆ ATP

55. **Define calvin cycle. Where does it occur?** (RWP, 2018) (RWP, 2019)

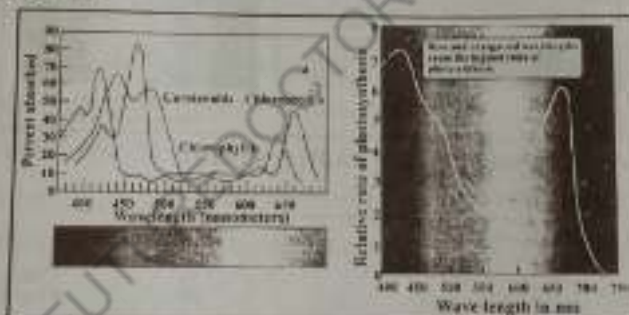
Ans. Calvin Cycle: The set of chemical reactions that take place in stroma of chloroplast is called calvin cycle. It does not require light directly and can occur in the presence as well as absence of light.

56. **Differentiate between Light Reaction and Dark Reaction of Photosynthesis.** (RWP, 2019)

Ans.

Light Reaction of Photosynthesis	Dark Reaction of Photosynthesis
Light reaction of photosynthesis needs light or sunlight energy absorbed by photosynthetic pigments. The photosynthetic pigments are organized into clusters, called photosystems for efficient absorption and utilization of solar energy in thylakoid membranes.	Dark reaction of photosynthesis do not require light directly and can occur in the presence as well as absence of light. The dark reactions take place in the stroma of chloroplast.

57. **Draw action spectrum showing photosynthesis rate at various light colours.** (LHR, GII, 2019)

Ans. Action Spectrum:

58. **What are alcoholic fermentation and lactic acid fermentation?** (GRW, AJK, 2019)

Ans. Alcoholic Fermentation: Takes place in primitive cells and in some eukaryotic cells such as yeast.

Pyruvic acid is broken down by alcoholic fermentation into alcohol.

$$2(C_3H_4O_3) \xrightarrow{2NADH_2 \rightarrow 2NAD^+} 2(C_2H_5OH) + 2CO_2$$

Lactic Acid Fermentation: In lactic acid fermentation each pyruvic acid molecule is converted into lactic acid ($C_3H_6O_3$) in the absence of O_2 gas.

$$2(C_3H_4O_3) \xrightarrow{2NADH_2 \rightarrow 2NAD^+} 2(C_3H_6O_3)$$

During anaerobic respiration only 2% of the energy present within the chemical bonds of glucose is converted into adenosine triphosphate. But fermentation is a way to produce

ATP even through O_2 is temporarily in limited supply.

59. What is the role of antenna complex in photosynthesis? (FBD. GI. 2019)

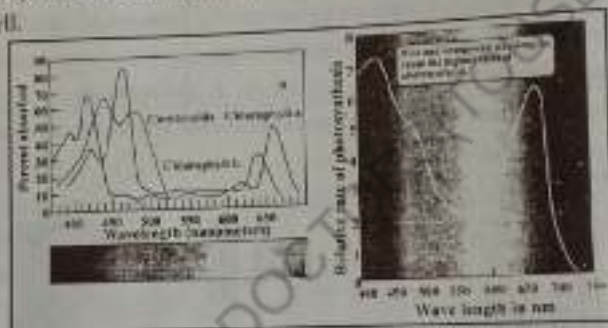
Ans. Role of antenna complex in photosynthesis:

i. It is light gathering part.
ii. It has Chlorophyll a, Chlorophyll b and Carotenoids
iii. Which are responsible for channeling the energy to reaction center.

60. What is biological oxidation? (RWP. 2019)

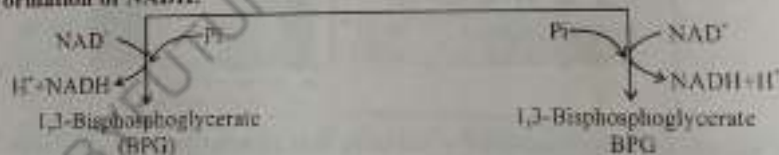
Ans. Biological Oxidation: The maintenance of living system require a continual supply of free energy which derived from various oxidation reduction reaction. In some cases biological oxidation involves the removal of hydrogen a reaction Catalyzed by the dehydrogenases linked to specific enzymes cellular respiration is essentially an oxidation process.

61. Define absorption spectrum along with its diagram. (DGK. 2019)

Ans. Absorption Spectrum: In which for chlorophylls indicates that absorption maximum in blue and red parts of the spectrum two absorption peaks being at around 430nm and 670nm respectively. Absorption peaks of carotenoids are different from those of chlorophyll.

62. Give the steps of glycolysis where NADH is formed. (DGK. 2019)

Ans. Formation of NADH:

NAD — Pi → H^++NADH → 1,3-Bisphosphoglycerate (BPG)

Pi — NAD^+ → NADH+H^+ → 1,3-Bisphosphoglycerate BPG

63. What is a photosystem? Name its two parts or components. (AJK. 2019)

Ans. Photosystem: Sunlight energy which is absorbed by photosynthetic pigments drives the process of photosynthesis. Photosynthetic pigments are organized into clusters called Photosystem.

Parts: Each photosystem consist of two parts, of a light gathering.

i. Antenna Complex ii. Reaction Center

ESSAY TYPE QUESTIONS

Q1. Prove that water is a source of oxygen photosynthesis. (LHR. GI, FBD. GI. 2016)

Q2. Describe water as important reactant of photosynthesis. (SWL. GI. 2016)

Q3. Write a note on structure of chlorophyll. (SWL. GI, 2017)

Q4. Explain the chloroplast as the "sites of photosynthesis" in plants. (GRW. GI, 2017)

Q5. Discuss the role of CO_2 in photosynthesis. (FBD. GI, 2017)

Q6. Briefly describe the steps involved in the non-cyclic phosphorylation.
(LHR. GII, FBD. GI, 2015) (AJK. GI, 2016)

Q7. Describe in detail cyclic phosphorylation. (LHR. GI, 2015) (BWP. GI, 2017)

Q8. Give the diagrammatic representation of non-cyclic electron flow in photosynthesis. (BWP. GI, 2015) (BWP. GI, DGK. GI & GII, 2016) (BWP. GII, 2017)

Q9. Describe chemiosmosis in detail. (SWL. GI, 2014)

Q10. Explain light dependent reaction in detail. (SGD. GI, 2016)

Q11. Draw and label Z-scheme/non-cyclic phosphorylation.
(LHR. GII, 2017) (FBD. 2018) (LHR. FBD. SGD. 2019)

Q12. Draw and describe Calvin cycle in photosynthesis.
(SDG. GI, BWP. GI, 2014) (LHR. GII, 2015) (BWP. GI, 2016) (LHR. GI, 2017)

Q13. What is Respiration? Give detail on Anaerobic respiration. (SGD. GI, 2016)

Q14. Differentiate between Aerobic and Anaerobic Respiration. (MLN. GII, 2017)

Q15. What is Glycolysis? Sketch its various steps only.
(GRW. GI & GII, 2014) (GRW. GI & GII, MLN. GI, BWP. GI, 2015) (MLN. GI, SGD, BWP, 2018)

Q16. Explain krebs cycle. (Give only outline of kreb cycle)
(LHR. GI, FBD. GI, MLN. GI, 2014) (SGD. GII, DGK. GI & GII, AJK. GI, 2015)
(LHR. GII, GRW. GII, 2016) (MLN. GI, DGK. GI & GII, 2017) (LHR. GI, 2018) (MLN. GII, AJK. 2019)

Q17. Describe citric acid cycle with appropriate diagram. (SGD. GI, 2015)

Q18. Describe respiration chain. (BWP. GI, 2017)

Q19. What is oxidative phosphorylation? Discuss. (GRW. 2018)

Q20. Describe the role of water in Photosynthesis. (MLN. GII, BWP. 2018)

Q21. Write note on Calvin Cycle. (LHR. GII, SWL. 2019)

Q22. Describe respiratory electron transport chain. (GRW. 2019)

Q23. What is anaerobic respiration? Discuss its types. (MLN. GI, 2019)

Q24. Draw glycolysis. Give its energy balance. (FBD, BWP, DGK. 2019)

Q25. Explain Electron Transport Chain in Mitochondria. (BWP. 2019)

CHAPTER 12

Nutrition

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. **HCl is secreted by gastric gland's cells of stomach:** (LHR. GI, 2014) (MLN. GI, 2018) (LHR. GII, 2017)
   (A) Mucous cells (B) Chief cells
   (C) Parietal cells (D) Zymogene cells
2. **Liver secretes bile into:** (LHR. GI, 2016)
   (A) Ileum (B) Stomach **(C)** Duodenum (D) Jejunum
3. **If the absorption of water and salt does not take place due to infection, drug action or emotional disturbance, a condition known as:** (LHR. GI, 2017)
   (A) Diarrhea (B) Vomiting (C) Dyspepsia (D) Anorexia
4. **Which is not related to gastric juice in humans?** (LHR. GI, 2016)
   (A) Pepsin (B) Mucus (C) HCl **(D)** Amylase
5. **These animals have large canine:** (LHR. GII, 2014)
   (A) Carnivores (B) Detritivores (C) Herbivores (D) Omnivores
6. **Carnivorous plants live in soils that are deficient in:** (GRW. GI, 2015)
   (A) Potassium (B) Oxygen **(C)** Nitrogen (D) Magnesium
7. **Which one is a parasitic plant?** (FBD. GI, 2015)
   (A) Pitcher plant (B) Venus fly trap (C) Sundew **(D)** Dodder
8. **The organism that lives upon or within another organism is called:** (LHR. GII, 2014) (LHR. GI, 2018)
   (A) Predator (B) Pest **(C)** Parasite (D) Host
9. **Which one of the following is not a carnivore?** (LHR. GI, 2014)
   (A) Cat (B) Dog (C) Lion **(D)** Deer
10. **The human stomach is situated below the:** (LHR. GII, 2016)
    (A) Diaphragm (B) Liver (C) Kidneys (D) Spleen
11. **Which are not omnivores?** (FBD. GI, 2014)
    (A) Bears **(B)** Deer (C) Crows (D) Pigs
12. **The process of taking in foods is:** (GRW. GI, 2014)
    (A) Digestion **(B)** Ingestion (C) Absorption (D) Assimilation
13. **In plants stunted growth of roots is due to deficiency of:** (GRW. GI, 2017)
    (A) Potassium (B) Phosphorous
    (C) Magnesium **(D)** Nitrogen
14. **In Hydra, ectodermal cells get food from endodermal cells by:** (GRW. GII, 2016)
    (A) Osmosis (B) Active transport
    (C) Facilitated Diffusion **(D)** Diffusion
15. **The animals which eat both plants and animals are called:** (BWP. GI, 2016)
    (A) Herbivores (B) Carnivores
    (C) Filter feeders **(D)** Omnivores

16. **Elimination of undigested matter by an animal is called:** (RWP. GI. 2015)
(A) Ingestion (B) Excretion (C) Absorption (D) Digestion

17. **Utilization of products of digestion for production of energy or synthesis of cellular material is:** (RWP. GI. 2016)
(A) Absorption (B) Digestion (C) Assimilation (D) Egestion

18. **The first part of small intestine is called:** (RWP. GI. 2018)
(A) Rectum (B) Ileum (C) Jejunum (D) Duodenum

19. **The middle part of the small intestine of man is called:**
(A) Jejunum (B) Duodenum (C) Ileum (D) Colon

20. **Tentacles is a characteristic of:** (LHR. GI. 2017)
(A) Hydra (B) Snail (C) Amoeba (D) Euglena

21. **Sites of Digestion in the digestive system of man are:** (LHR. GI. 2014)
(A) 01 (B) 02 (C) 03 (D) 04

22. **Sublingual glands are located below the:** (SGD. GI. 2014)
(A) Jaws (B) Ear (C) Tongue (D) All above

23. **Carbohydrate digesting enzymes are called:** (SGD. GII. 2014)(LHR. GI, MLN. GI. 2016)
(A) Ligase (B) Amylase (C) Protease (D) Lipase

24. **Which of the following secrete pepsinogen:** (SGD. GI. 2017)
(A) Mucus cells (B) Parietal cells (C) Oxyntic cells (D) Zymogen cells

25. **Incomplete or imperfect digestion is called:** (FBD. GI. 2017)
(A) Food poisoning (B) Obesity (C) Dyspepsis (D) Ulcer

26. **Which type of cells in human stomach secrete Gastrin:** (RWP. GI. 2014)
(A) Mucous Cells (B) Parietal cells
(C) Zymogen cells (D) Endocrine cells

27. **A plant requires Nitrogen and Sulphur for its:** (MLN. GI. 2014)
(A) Cell wall (B) Enzyme (C) Starch deposits (D) DNA replication

28. **Gastric secretion is inhibited by:** (MLN. GI. 2014)
(A) Bile (B) Pancreatic juice
(C) Secretin (D) Gastrin

29. **Some bacteria break down the proteins of dead plants and animals and release:** (FBD. GI. 2014)
(A) Potassijm (B) Phosphorus (C) Nitrates (D) Oxygen

30. **The uptake of the diffusible food molecules from the digestive region across the membrane into the cell is called:** (MLN. GII. 2015)
(A) Ingestion (B) Digestion (C) Absorption (D) Assimilation

31. **Biological name of Sundew is:** (MLN. GII. 2016)
(A) Dionaea muscipula (B) Drosera intermedia
(C) Sarracemia pupurea (D) Medicgo stiva

32. **Rodents are:** (MLN. GI. 2014) (MLN. GI. 2015)
(A) Herbivores (B) Detritivores (C) Carnivores (D) Omnivores

33. **The length of Jejunum is about:** (AJK.GI. 2015)
(A) 2.8m (B) 2 m (C) 1.4 m (D) 2.4 m

34. **Which one of the following is not a carnivore?** (MLN. GI. 2016)
(A) Cat (B) Dog **[C]** Bear (D) Tiger

35. **If bile pigments are accumulated in Blood, condition is known as:** (MLN. GI. 2017) (SWL. 2018)
(A) Gall stone **[B]** Jaundice (C) Pyrosis (D) Heart pang

36. **Emulsification is the function of:** (MLN. GII. 2013)
[A] Bile (B) Lipase (C) Amylase (D) Protease

37. **Gall stones are formed in the gall bladder due to the precipitation of:** (FBD. GI. DGK. 2017)
(A) Glycerol **[B]** Cholesterol (C) Sterols (D) Salts

38. **The length of Duodenum of human is about:** (BWP. GI. 2017) (GRW. 2019)
(A) 15 - 20 cm **[B]** 20 - 25 cm (C) 30-35 cm (D) 10 - 15 cm

39. **In man most of the digestion takes place in:** (BWP. GI. 2015)
(A) Stomach **[B]** Small intestine (C) Large intestine (D) Mouth

40. **Bacteria which produce vitamin K are present in:** (GUJ. GI. 2016)
(A) Small intestine **[B]** Large intestine (C) Stomach (D) Duodenum

41. **Excess gastric secretion is an important factor for:** (SWL. GI. 2014) (SWL. GI. 2015) (RWP. 2019)
(A) Obesity (B) Piles (C) Food poisoning **[D]** Peptic Ulcer

42. **One of the following plays a slight antiseptic role in the oral cavity:** (DGK. GI. 2014)
(A) Water (B) Mucus **[C]** Sodium bicarbonate (D) Amylase

43. **A neurotic disorder in slightly older girls is:** (LHR. GII. 2015)
(A) Anorexia nervosa **[B]** Bulimia Nervosa
(C) Dyspepsia (D) Obesity

44. **Each villus is richly supplied with blood capillaries and vessel of lymphatic system called:** (DGK. GII. 2014)
(A) Arteriole (B) Bronchiole **[C]** Lacteal (D) Coelom

45. **Muscles of stomach are of which type?** (LHR. GI. 2019)
(A) Skeletal **[B]** Smooth (C) Cardiac (D) Voluntary

SHORT ANSWER QUESTIONS

1. **Give the features of saprophyte.** (LHR. GI. 2015)

Ans. Features of saprophyte:

i. Saprophytes produce extra cellular enzymes which digest the decying matter and then absorb the soluble products back into their cells. Many fungi and bacteria are saprophytes e.g.

ii. Some bacteria break down the proteins of dead plants and animals and release nitrates

iii. These nitrates are taken up by the plant roots build new amine acids and proteins, thus helping in nitrogen cycle.

2. **Differentiate between Absorption and Assimilation.** (LHR. GI. 2017) (BWP. 2019)

Ans.

Absorption	Assimilation
It is the process in which digested food molecules from the digestive region or through a transport medium (blood and lymph). It takes place in the villi of small intesture in humans.	It is the utilization of digested products either for the production of energy or cellular material. It takes place in the cells.

3. **How Sundew (Drosera) show its insectivorous activity.** (LHR. GII, 2014) (LHR. GII, 2018)

Ans. In Sundew, the tiny leaves bear numerous hair like tentacles, each with a gland at its tip. The insects attracted by the plant's ordour cause nearby tentacles to bend over the animals thus they become entangled. In sundew also the proteins of insects are digested by enzymes and the products are absorbed.

4. **How Constipation and Diarrhoea are caused?** (LHR. GI, 2016) (RWP. 2019)

Ans. **Cause of Constipation:** Constipation is caused due to the slow movement of feces through the large intestine leading to excessive absorption of water.

Cause of Diarrhoea: Diarrhoea is caused due to rapid movement of fecal material through the large intestive leading to less absorption of water and electrolytes.

5. **Discuss parasitic nutrition in plants:** (SWL. GI, 2019)

Ans. **Parasitic nutrition in plants:** Feeding by living in or on other host organism belonging to different species is called parasitic nutrition.

Example: Dodder is a leafless plant that lives as a twining parasitic.

6. **What are Insectivorous plants? How they get their carbohydrates?** (LHR. GII, 2015)

Ans. **Insectivorous Plants:** Insectivorous plants are true autotroph, but when they capture prey, their growth becomes rapid. Apparently, nitrogenous components of animal body are of benefit to insectivorous plants.

In some insectivorous plants, the trapped insects are decomposed by bacteria, in others, the trappled insects are digested by enzymes secreted by the leaves.

Insectivorous plants get their carbohydrate through the process of photosynthesis, so they are also autotrophs. Example: Pitcher plant, venues fly trap, sundew.

7. **Differentiate between Glottis and Epiglottis.** (AJK. 2019)

Ans. **Difference between Glottis and Epiglottis:**

Glottis	Epiglottis
The opening of larynx is called glottis and is lined with mucous membrane.	Epiglottis serves as lid over glottis which has a muscularly controlled hinge-like action. It is automatically covers the glottis of the larynx during the act of swallowing.

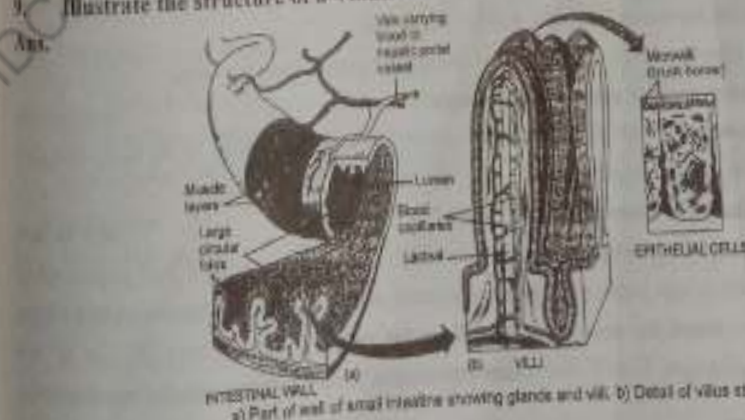
8. **What are root nodules? Give their role.** (DGK. GII, 2017)

Ans. **Root Nodules:** The leguminous plants develop nodules on their roots. These nodules contain nitrogen fixing bacteria. The bacteria live on the plant material and fix atmospheric nitrogen. They convert this nitrogen into nitrates. These nitrates are used by the plants.

9. **Illustrate the structure of a Villus.** (RWP. GI, 2014)

Ans.

a) Part of wall of small intestine showing glands and villi. b) Detail of villus structure.

(MLN. GI. 2014)

10. **Give the names of four digestive juices in man.**

Ans. Four digestive juices in man:

i. Saliva ii. Gastric Juice iii. Intestinal Juice iv. Pancreatic Juice

(LHR. GI. 2017)

11. **What is Holozoic Nutrition?**

Ans. Holozoic Nutrition: The nutrition in which complex, non-diffusable food is taken in and digested into smaller diffusible molecules which can be absorbed and assimilated is called holozoic nutrition. It is found in free living animals which have a specialized digestive tract in which various processes occur. holozoic nutrition is achieved by ingestion, digestion, absorption, assimilation and egestion.

(MLN. GI. 2017)

12. **Name diseases caused by clostridium botulinum and salmonella.**

Ans. Clostridium botulinum causes Botulism, a severe form of food poisoning Salmonella causes common food poisoning.

(MLN. GI. 2016)

13. **How is food swallowed by you?**

Ans. Swallowing of food: Following are the events which occur during swallowing.

i. The tongue moves upwards and backwards against the roof of the mouth, forcing the bolus to the back of the mouth cavity:

ii. The backward movement of the tongue pushed the soft plate up and closes the nasal opening at the back.

iii. At the same time the tongue forces the epiglottis (a flap of cartilage) into more or less horizontal position thus closing the opening of the windpipe (the glottis).

iv. The larynx, cartilage round the top of the windpipe, moves upward under the back of the tongue.

v. The glottis is partly closed by the contraction of a ring of muscles.

vi. The food does not enter the partly open glottis, because the epiglottis diverts the food mass to one side of the opening and safely down the esophagus.

14. **Name characteristic processes involved in holozoic nutrition.**

(GRW. GI. 2015) (GRW, FBD. GII. 2019)

Ans. The characteristic process involved in holozoic nutrition:

i. Ingestion ii. Digestion iii. Absorption iv. Assimilation v. Egestion.

15. **Define digestion and egestion.**

(DGK. GII. 2015)

Ans. Digestion: Digestion is the breakdown of complex organic compounds of food into simpler diffusible molecule by the action of enzymes.

Egestion: Egestion is the elimination of undigested matter from the body.

16. **Define gastrovascular cavity with example:**

(AJK. GI. 2015)

Ans. Gastrovascular Cavity: Gastrovascular cavity is the central cavity of the body of hydra which functions as a digestive cavity. It is also known as coelenteron.

17. **How Pepsinogen is converted into Pepsin?**

(MLN. GI. 2015)

Ans. Conversion of Pepsinogen into Pepsin: Pepsinogen is converted into pepsin when exposed to the acidic medium or to some already activated pepsin. This conversion occurs when bolous enters the stomach is stimulates the gastric pits to secrete HCl (as H^+ and Cl^-) and pepsinogen. The H^+ ions cause pepsinogen to be converted into the active enzyme pepsin.

18. **What are Omnivores? Give their two examples.** (FBD. GI, 2016) (AJK. 2018)

Ans. Omnivores: Omnivores are the animals which eat both plants and animal food. Omnivores have the teeth structurally and functionally intermediate between the extremes of specialization attained by the teeth of herbivores and carnivores.

Examples:

i. Crows ii. Rats

19. **Differentiate between Herbivores and Carnivores.** (MLN. GI, 2016)

Ans.

Herbivores	Carnivores
i. Animals that feed on plants are called herbivores.	i. Animals which feed on other animals are called carnivores.
ii. In herbivores mammals, the premolars and molars have large grinding surfaces. There is a large gap between the incisors and premolars. Canines are missing. In grazing and browsing herbivores, i.e. deer and sheep, are no upper incisors.	ii. Carnivores have large canine teeth for catching and tearing the prey. Incisors premolars and molars are all adapted for cutting flesh, cracking bones and reducing the chunks to sizes suitable for swallowing.

20. **Differentiate between ingestion and Egestion.**
(RWP. GI, 2016) (LHR. GII, 2017) (DGK. GII, 2018) (DGK. 2019)

Ans.

Ingestion	Egestion
Ingestion is the taking in of complex food. Ingestion takes place through mouth opening in humans.	Egestion is the elimination of undigested matter from the body. Egestion takes place through anus in humans.

21. **Define Villi. Name the Lymphatic Vessel present in Villi.** (DGK. GII, 2014) (GRW. 2018)

Ans. Villi: Villi are numerous finger like outgrowths or projections that project about 1 mm from the surface of mucosa of ilum and consist of a covering of epithelial cells and capillaries of blood and vessels of lymphatic syustem. They increase the absorptive area about 10 fold.

The Lymphatic vessel present in Villi is called lacteal.

22. **Write components and functions of saliva.** (MLN. GI, 2014) (SGD. GI, DGK. GI, 2015)
(LHR. GI & GII, GRW. GI, FBD. GI, 2016) (MLN. GI, SWL. 2018)

Ans. Components of Saliva:

i. Water and mucous.
ii. Sodium bicarbonate and some other salts.
iii. Amylase or ptyalin.

Function of Saliva: Main functions of saliva are Lubrication and Digestion of food in the oral cavity.

23. **Name the various types of salivary gland in man?**
(MLN. GII, RWP. GII, DGK. GI, 2017) (MLN. GI, 2018)

Ans. Types of salivary glands:

i. Sublingual glands situated below the tongue.
ii. Sub maxillary glands behind the jaws.
iii. Parotid glands in front of the ears.

24. What is peristalsis and antiperistalsis?

(FBD. GI, MLN. GI, SGD. GI, AJK. 2015) (MLN. GI, SGD. GI, BWP. GII, 2016) (BWP. GI, 2017) (FBD. BWP. 2018) (LHR. GII, MLN. GII, SGD. 2019)

Ans.

Peristalsis	Anti-peristalsis
i. Peristalsis consists of the wave of contraction of the circular and longitudinal muscles preceded by the wave of relaxation thus squeezing the food down along the canal.	i. Anti peristalsis is the reverse of peristalsis in which the food may be passed from the intestine back into the stomach and even into the mouth.
ii. Peristalsis are characteristic movements of the digestive tract by which food is moved along the cavity of canal.	ii. Anti peristalsis occurs occasionally, and leads to vomiting.

25. What is hunger pang? (BWP. GII, 2016) (LHR. GI, AJK. 2019)

Ans. Hunger Pang: Hunger contractions are peristaltic contractions which are increased by low blood glucose levels and are sufficiently strong to create an uncomfortable sensation often called a hunger pang.

Hunger pang usually begin 12 to 24 hours after the previous meal or in less time for some people.

26. Define Digestion. (RWP. GI, 2017)

Ans. Digestion: The breakdown of complex organic compounds of food into simple diffusible molecules by the action of enzymes is called digestion. For example proteins like meat, fish, and egg are broken into amino acids.

27. Write down the location of stomach. (LHR. GI, 2014)

Ans. Location of Stomach:

The stomach is situated below the diaphragm on the left side of the abdominal cavity.

28. Differentiate between chyme and bolus.

(DGK. GI, BWP. GI, 2015) (RWP. GI, 2016) (BWP. GII, 2017) (SWL. 2018) (SGD. 2019)

Ans.

Chyme	Bolus
The semi fluid mass of food material produced by the action of digestive juice in the stomach and passes from the stomach to the small intestine.	Bolus is a moistened lump created by chewing of food in oral cavity and then pushed to the back of the mouth by the action of tongue and muscle of pharynx.
Stomach → chyme → small intestine	Oral cavity → Bolus → Oesophagus

29. Describe the three kinds of cells present in gastric glands.

(FBD. GI, BWP. GI, 2014) (SGD. GII, 2015) (SWL. GI, SGD. GI, 2016)

Ans. Composition of Gastric Glands:

i. Mucus cells secrete.

ii. Parietal or oxyntic cells secret hydrochloric acid.

iii. Zymogen cells secrete pepsin.

Composition of Gastric Juices: Gastric juice is the secretions of three kinds of cells of gastric glands. Gastric juice contains mucus, HCL, and pepsinogen.

30. **What prevents the wall of stomach from being digested?** (GRW. G1, 2014) (GRW. GII, 2015)

Ans. Mucus secreted by mucous cells protects the wall stomach from being digested.

31. **Give the two ways by which pepsinogen is activated?** (MLN. GI, 2014)

Ans. Pepsin is an enzyme secreted in an inactive form called pepsinogen. Pepsinogen is activated to pepsin when exposed to the acidic medium or to some already activated pepsin.

32. **What is the mucosa of the stomach? Give its significance.** (GRW. GII, 2016) (MLN. GI, 2017)

Ans. **Mucosa of Stomach:** The mucosa of stomach is the inner layer of connective tissue of stomach wall.

Significance of Mucosa of Stomach: The Mucosa of the stomach possesses numerous tubular gastric glands, which are composed of three kinds of cells:

i. Mucous Cells, that secrete mucus.

ii. Parietal or oxyntic cells, secrete hydrochloric acid.

iii. Zymogen cells, which secrete pepsinogen.

The secretion of all these cells is collectively called gastric juice. The secretion of the gastric juice is regulated by small, sight and quality of food.

33. **What is ulcer?** (MLN. GII, 2017)

Ans. **Ulcer:** The sore in the inner wall of the digestive tract is called ulcer. The inner wall of digestive tract is covered with mucous. Mucous protects the inner membrane from the action of enzymes. If the mucous layer is broken, the digestive enzymes start eating the wall of stomach and duodenum. This results in the sore called ulcer. In some cases, the ulcer is so severe that a hole develops in wall of the digestive tract. Therefore, the content of the digestive tract come out into the abdominal cavity. It causes severe infection. If immediate medical care is not given, it may prove to be a fatal. Excess gastric acid secretion is an important factor of the peptic ulcer.

34. **Write the composition of pancreatic juice.** (LHR. GI, GRW. GI, 2017) (LHR. GII, 2018)

Ans. The exocrine tissues of pancreas secrete a juice called pancreatic juice. The pancreatic juice has many enzymes. These enzymes digest the different components of food like carbohydrates, fats and proteins. These enzymes are:

i. **Amylase:** It is also called amylopsin. It digests starch into maltose.

ii. **Lipase:** It is a fat digesting enzyme. It hydrolyses fats into fatty acids and glycerol.

iii. **Trypsin:** It is secreted in inactive form called trypsinogen. Trypsin splits proteins into peptones and polypeptides.

35. **Enlist enzyme secreted from Jejunum.** (FBD. GI, 2017)

Ans. **Enzyme secreted from Jejunum:**

i. **Amino Peptidase:** It acts on polypeptides and change them into dipeptides.

ii. **Erypsin:** It acts on dipeptides and change them into amino acids.

iii. **Lipase:** It acts on fats and break them into fatty acid and glycerol.

iv. **Maltase:** It acts on maltose and break it into glucose.

Lactase: It acts on lactose and break it into glucose and galactose. Many humans lack lactase for the digestion of lactose in milk. So they develop intestinal diarrhea by consuming milk products.

36. Differentiate between appendix and appendicitis.
(MLN. GI, BWP. GI, 2015) (SWL. GI, DGK. GI, AJK. GI, 2016) (LHR. GI, 2017) (BWP. 2018)

Ans.

Appendix	Appendicitis
Appendix arises as a finger like process or projection from the blind end of caecum of large intestine	Appendicitis is an inflammation of appendix due to entrapping and putrefaction of food. Appendicitis is treated by surgical removal of appendix.

37. Give the role of large intestine of human. (GRW. GI, 2018)

Ans. Function of the large intestine: The large intestine performs following functions:

i. **Absorption of water and salts:** The material that passes from the small intestine to the large intestine has a large amount of water, dissolved salts and undigested material. Most of the water and salts are absorbed into blood.

ii. **Synthesis of Vitamins:** A large population of bacteria lives inside the large intestine. These bacteria synthesized some vitamins especially, vitamin K. Vitamin K is absorbed by the blood and used in the body.

iii. **Removal of feces:** The feces are also removed by the large intestine through anus. Feces contain a large number of bacteria, plants fibers, broken mucosal cells, mucous, cholesterol, bile pigments and water.

38. What are the piles? (LHR. GI, 2018)

Ans. Piles: Piles is common disease related to nutrition.

Causes and Symptoms:

i. Piles or haemorrhoids are masses of dilated, tortuous veins in the anorectal mucosa.

ii. These masses may sometimes start bleeding during bowl movements. Situation may aggravate (make worse) when the patient suffers from constipation.

iii. The urge to defecate (discharge faeces from the body) is depressed and it becomes difficult to expel the faeces.

iv. This may cause other symptoms of ill health because of the physical distension of the rectum.

39. Differentiate between intracellular and extracellular digestion. (LHR. GII, 2018)

Ans.

Intracellular Digestion	Extracellular Digestion
In intracellular digestion, break down of food occurs within the cells. First food is taken into the cell in vacuoles. The cytoplasm secretes ones, which enter the cytoplasm from the vacuole.	In extracellular digestion, enzymes are secreted outside the cell into the gut cavity or lumen where digestion takes places.

40. Differentiate between Saprophytic and Parasitic mode of nutrition. (MLN. GII, 2018)

Ans.

Saprophytic Mode of Nutrition	Parasitic Mode of Nutrition
Feeding on dead and decaying matther such as dead leaves in the soil or rotting tree trunks in called saprophytic nutrition and the organisms are known as saprophytes or saproptrophs.	Feeding by living in or on other organisms (its host) belonging to different species is called parasitic nutrition and the organisms are called parasites.

41. What is meant by symbiotic nutrition? Give its examples. (MLN. GII, SGD. 2019)

Ans. Symbiotic Nutrition: It is a mutual nutrition between organisms living in association with one another.

These organisms belong to two different species. Some important examples are lichens, mycorrhiza and root nodules and nitrogen fixing bacteria.

i. The lichen is made of a fungus and an alga.

ii. Mycorrhiza is an association between a fungus and roots of higher plants (about 95%)

42. What is saprophytic nutrition? (DGK. GI, 2018)

Ans. Saprophytic Nutrition: Feeding on dead and decaying matter such as dead leaves in the soil or rotting tree trunks is called saprophytic nutrition and the organisms are known as saprophytes or saprotrophys.

43. What do you understand by anti-peristalsis? (DGK. GI, 2018)

Ans. Anti-Peristalsis: Sometimes the process of peristalsis is reversed, so food may be passed form the intestine back into the stomach and even into the mouth. This movement is called antiperistalsis, which leads to vomiting.

44. What is bile? Give its functions. (FBD. 2018)

Ans. Bile: Bile is a green, watery fluid. It is secreted by the liver which may be temporarily stored in the gall bladder and released into the duodenum through the bile duct.

45. What are hemorrhoids? (LHR. GI, 2019)

Ans. The piles or hemorrhoids are masses of dilated tortuous veins in the anorectic mucos. These masses may sometimes start bleeding during bowl movements.

46. Define nutrition. (FBD. GI, 2019)

Ans. Nutrition: The sum total of all the process involved in the taking in and utilization of elements by which growth, repair and maintenance of activities in the organism are accomplished maintenance of activities in the organism are accomplished is called nutrition.

47. Write only two functions of oral cavity. (DGK. GII, 2015) (LHR. GII, FBD. GII, BWP. 2019)

Ans. Two functions of oral cavity:

i. **Selection of food:** When food enters the oral cavity, it is tested, smelled, and felt. If the taste or smell is unpleasant if hard objects like bone and dirt are present in the food it is rejected.

ii. **Grinding or mastication:** After selection the food is ground by means of molar teeth into smaller pieces. This is useful because the esophagus allows relatively small pieces to pass through and small pieces have much move surface for the enzyme to attack.

48. Write down function of Villi. (MLN. GI, 2019)

Ans. Villi: We know that small intestine consists of duodenum, jejunum and ileum. All absorption of the products of digestion takes place in the ileum. The internal surface of ileum has many folds which exhibit velvety appearance due to the presence of numerous finger like out growths called "villi".

Each villi is richly supplied with blood capillaries and a vessel. The total area of absorption become due to the enfolding villi and microvilli.

49. What is gastrin? Give its function. (MLN. GII, SWL. 2019)

Ans. Gastrin: Gastrin is a peptide harmone that stimulate secretion of gastric acid by the parietal cell of the stomach and aids in gastric motility. It is released by 'G' cells in the pyloric antreem of the stomach, duodenum and the pancreas.

50. **Differentiate between carnivores and omnivores.** (SGD. GII, 2015) (AJK. GI, 2016) (RWP. 2015)

Ans. Differences between carnivores and omnivores:

Carnivores	Omnivores
i. Animals which feed on other animals are called Carnivores.	i. The omnivores are the animals which eat both plant and animal both.
ii. They have large canine teeth for catching and tearing the prey.	ii. They have the teeth structurally and functionally intermediate between the extreme of specialization attained by teeth of herbivores and carnivores.
iii. Cat, dog, tiger, lions are common examples of Carnivores.	iii. Crow, rat, bear and man are the examples.

ESSAY TYPE QUESTIONS

Q1. Discuss Heterotrophic Nutrition methods in plants. (SGD. GII, 2015) (DGK. GII, 2017) (SWL. DGK. 2019)

Q2. Discuss the process of nutrition in insectivorous plants. (DGK. GI, 2016) (LHR. GII, RWP. GI, RWP. GI, 2017) (AJK. 2018)

Q3. With the help of examples, discuss parasitic nutrition in animals. (MLN. GI, 2014)

Q4. Write a note on methods of animal nutrition with at least four examples. (DGK. GI, 2017)

Q5. Explain different process involved in digestion and absorption in animals.

Q6. Describe digestion in oral cavity of man. (GRW. GII, FBD. GI, 2014) (RWP. GI, RWP. GI, SGD. GI, 2015) (GRW. GI, 2017) (DGK. GI, 2018)

Q7. Explain digestion in human stomach. (DGK. GII, 2015) (FBD. GI, DGK. GII, RWP. GI, 2016) (GRW. 2018)

Q8. Describe the stomach in relation to their structure and function. (SGD. GII, 2016)

Q9. Write a note on absorption of food in ileum of human. (GRW. GII, 2015)

Q10. Describe the function of enzyme present in pancreatic juice. (GRW. GI, 2014)

Q11. Describe the role of pancreas in liver in food digestion in Human. (SGD. GI, 2016)

Q12. Describe the role of large intestine in human digestion. (LHR. GII, 2015) (GRW. GI, 2016) (SWL. RWP. 2018)

Q13. Write a note on the following: i. Obesity ii. Bulimia nervosa (SWL. GI, 2014)

Q14. Describe any two diseases related to nutrition. (LHR. GI, 2015)

Q15. Write a note on Food Poisoning. (RWP. 2018)

Q16. How insectivorous plants meet their demands of organic compounds? Describe three methods. (GRW. 2019)

Q17. Explain causes and remedy of food poisoning and obesity. (MLN. GI, 2019)

Q18. Describe events that occur during the process of swallowing. (MLN. GII, 2019)

****

CHAPTER 13

Gaseous Exchange

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. **How much air is held by lungs when they are fully inflated in man?** (LHR. GI, 2018) (SGD. GI, 2018)
   (A) 5 liters (B) 4.5 liters (C) 4 liters (D) 3.5 liters
2. **Water is more viscous than air:** (FBD. GI, 2015) (AJK. 2018)
   (A) 10 Times (B) 20 Times (C) 50 Times (D) 100 Times
3. **During Photorespiration, glycolate diffuses into the membrane bounded organelle named as:** (SGD. GI, 2014)
   (A) Mitochondria (B) Ribosome (C) Peroxisome (D) Golgi Bodies
4. **Breathing rate in man at rest is:** (LHR. GII, 2014)
   (A) 0.1-15 times / min (B) 15-20 times / min
   (C) 20-25 times / min (D) 25-30 times / min
5. **The main site of exchange of Gases in plants are:** (GRW. GI, 2016)
   (A) Stomata (B) Lenticel (C) Cuticle (D) Epidermis
6. **The exchange of gases (CO_2 and O_2) between the organism and its environment is called:** (LHR. GI, 2016)
   (A) Respiration (B) External respiration
   (C) Cellular perspiration (D) Anaerobic Respiration
7. **Oxygen content of fresh air are:** (RWP. GI, 2016) (DGK. 2019)
   (A) 200ml / litre (B) 100ml / litre (C) 10ml / litre (D) 150ml / litre
8. **When oxygen saturation is 100 mm of mercury then hemoglobin saturation is:** (LHR. GI, 2014)
   (A) 100% (B) 98% (C) 78% (D) 68%
9. **Hemoglobin in man increases the oxygen carrying capacity of the blood to about:** (LHR. GII, 2014)
   (A) 75 times (B) 50 times (C) 60 times (D) 100 times
10. **Respiratory activity which occurs in plants during day time is called:** (LHR. GI, 2016)
    (A) Respiration (B) Transpiration
    (C) Photorespiration (D) Cutaneous respiration
11. **The complex cartilaginous structure at the upper end of the trachea is called:** (GRW. GI, 2016)
    (A) Larynx (B) Alveoli (C) Bronchiole (D) Pharynx
12. **Blood contains oxygen per 100 ml of blood when haemoglobin is 98% saturated:** (GRW. GI, DGK. GII, 2015)
    (A) 19.6 ml (B) 18.6 ml (C) 17.6 ml (D) 16.6 ml
13. **The most efficient and highly modified for gaseous exchange in aquatic animals are:** (GRW. GI, 2014) (FBD. GI, 2015)
    (A) Gills (B) Lungs (C) Spiracles (D) Trachea
14. **A liter of H_2O contains ml of oxygen:** (RWP. GII, 2017)
    (A) 10 (B) 20 (C) 30 (D) 40

15. **A process in which ribulose biphosphate carboxylase / oxygenase (Rubisco) fixes oxygen instead of carbon dioxide is called:** (GRW. GII, 2014) (AJK. 2015)
(A) Respiration **(B) Photorespiration** (C) Glycolysis (D) Kreb's cycle

16. **All of the following contain cartilage except:** (GRW. GII, 2015)
(A) Larynx (B) Trachea **(C) Bronchioles** (D) Bronchi

17. **Oxygen content of fresh air is about _____ ml per liter as compared with water media:** (BWP. GI, 2015)
(A) 100 **(B) 200** (C) 400 (D) 800

18. **The total lungs capacity for air is:** (SGD. GI, 2014)
(A) Two litres (B) Three litres (C) Four litres **(D) Five litres**

19. **Air space between mesophyll cells of leaves comprise up to:** (FBD. GI, 2015)
(A) 20% (B) 30% **(C) 40%** (D) 50%

20. **The normal alveolar ventilation is regulated by:** (FBD. GI, 2014)
(A) Hemoglobin (B) Oxygen (C) Iron **(D) Carbon dioxide**

21. **The volume of air taken inside the lungs and expelled during exercise is about:** (BWP. GI, 2015)
(A) 2.5 Liters **(B) 3.5 Liters** (C) 1.5 Liters (D) 4.5 Liters

22. **Which one is the structure of respiratory system of man?** (GRW. GII, 2015)
(A) Esophagus **(B) Larynx** (C) Syrinx (D) Duodenum

23. **All are made up of cartilage except:** (FBD. GI, 2014)
(A) Bronchiole (B) Bronchi (C) Trachea (D) Larynx

24. **The diameter of bronchiole is:** (MLN. GI, 2014) (MLN. GI, 2015)
(A) 3 mm (B) 2 mm **(C) 1 mm** (D) 0.1 mm

25. **Percentage of carbon dioxide carried in the form of bicarbonate in plasma is:** (MLN. GI, 2017)
(A) 65 **(B) 70** (C) 75 (D) 80

26. **__________ is more important regulator of breathing process.** (MLN. GI, 2014)
(A) Oxygen **(B) Carbon dioxide** (C) Hemoglobin (D) Myoglobin

27. **Exhaled air contains CO_2:** (BWP. GI, 2016)
(A) 0.04% **(B) 4%** (C) .4% (D) 79%

28. **Tuberculosis is the disorder of:** (BWP. GI, 2015)
(A) Digestive System (B) Circulatory System
(C) Excretory System **(D) Respiratory System**

29. **Plasma proteins carry about % CO_2 from body fluids to lungs:** (GRW. GII, 2014)
(A) 1% (B) 2% (C) 4% **(D) 5%**

30. **Myoglobin occurs in:** (MLN. GII, 2017)
(A) Red blood cells (B) White blood cells (C) Plasma **(D) Muscle fibres**

31. **In human beings, the respiratory pigment is:** (BWP. GI, 2017)
(A) Myoglobin (B) Bilirubin **(C) Haemoglobin** (D) Haemocyanin

32. **Emphysema is the breakdown of:** (BWP. GI, DGK. GI, 2016)
(A) Hemoglobin **(B) Alveoli** (C) Teeth (D) Tissue

33. **The floor of chest cavity in man is:** (DGK. GI, 2015)
(A) Diaphragm (B) Pericardium (C) Pleura (D) Ribs

34. **More than ten compounds of tar of tobacco smoke are included in causing:** (DGK. GI, 2016)
(A) Cancer (B) Tuberculosis (C) Asthma (D) Emphysema

35. **Oxygen diffuses many times more quickly in air than in water:** (DGK. GII, 2016)
(A) 4000 times (B) 7000 times (C) 6500 times **(D)** 8000 times

36. **When equal intensities of light are given more photosynthesis takes place in spectrum:** (SWL. 2019)
(A) blue (B) orange **(C)** red (D) green

37. **100 ml of arterial blood of human being contains CO_2 (Carbon dioxide)** (DGK. GII, 2018)
(A) 50 ml (B) 54 ml (C) 56 ml (D) 58 ml

38. **Chlorophyll a is:** (SWL. 2019)
(A) red - green (B) yellow - green (C) orange - green **(D)** blue - green

39. **Carbon dioxide per 100 ml of venous blood is** (DGK. GI, 2018)
(A) 50 ml **(B)** 54 ml (C) 98 ml (D) 99 ml

40. **In human body percentage of nitrogen accounts for:** (SWL. 2019)
(A) 2% **(B)** 3% (C) 1% (D) 10%

SHORT ANSWER QUESTIONS

1. **In what way air is a better respiratory medium than water?**
(GRW. GI, SWL. GI, 2014) (GRW. GI & GII, DGK. GI, 2015) (GRW. GI, MLN. GI, RWP. GI, 2016) (LHR. GII, GRW. GI, SWL. GI, 2017) (DGK. 2019)

Ans. Followings are the reasons to explain that air is a better respiratory medium than water and oxygen can be obtained more easily from air than from water:
i. Oxygen content of air is much higher than the oxygen content of equal volume of water.
ii. Oxygen diffuses about 8000 times more quickly in air than in water because water is 8000 times more dense than air.
iii. Water is 50 times more viscous than air.

2. **What is Diaphragm? State its role in Breathing.** (LHR. GI, 2010) (MLN. GI, 2019)

Ans. Diaphragm: The floor of the chest cavity is called diaphragm, which is a muscular sheet. The shape of diaphragm is more dome like when its muscles relax and less dome like or flat when its mucles contract.

Role of Diaphragm In Breathing:

Diphragm is involved in exchanging the air in and out of the lungs:
i. I In inspiration muscles of diaphragm contract and it moves down ward, become less dome shaped or flat, enlarging the thoracic cavity due to which air rushes into the lungs.
ii. In expiration diaphragm is released, restores its normal position and becomes more dome shaped, reducing the chest cavity due to which air is expelled out.

3. **Define respiratory surface. Give their properties.**
(LHR. GI, SWL. GI, GRW. GII, 2014) (LHR. GII, DGK. GI, DGK. GII, 2015) (LHR. GII, FBD. GI, SGD. GI, AJK. GI, RWP. GI, 2016) (SWL. GI, 2017)

Ans. Respiratory Surface: Respiratory surface in animals is the site where gaseous exchange takes place.

Properties of Respiratory Surface in Animals:

Following are the properties of respiratory surfaces in animals:
i. Large surface and moisture.
ii. Thin epithelium.
iii. Ventilation.
iv. Capillary network.

4. **What are parabronchi?** (LHR. GI & GII, 2014) (LHR. GI, SGD. GII, DGK. GI, 2015)
(FBD. GI, AJK. GI, 2016) (DGK. GI, 2017) (GRW. AJK, 2018) (FBD. GI & GII, AJK, 2019)

Ans. Parabronchi: In the lungs of birds, tiny thin walled ducts called parabronchi are present

and the air is constantly ventilated instead of alveoli. These parabronchi open at both ends
The walls of parabronchi are chief sites of gaseous exchange.

Counter Current Exchange: The direction of the blood flow in the lungs is opposite to that of the air flow through the parabronchi. This counter current exchange increases the amount of oxygen which enters blood. Lungs in birds are very efficient in this respect as well, because no stale of air remains in the parabronchi.

5. How the volume of chest cavity is reduced during expiration? (LHR. GI, 2016)

Ans. The volume of chest cavity during expiration is reduced due to:

(a) Relaxation of muscles of ribs moving them downward and inward.

(b) Relaxation of muscles of diaphragm becoming it more domelike.

6. Differentiate between Inhalation and Exhalation. (LHR. GII, MLN. GI, DGK. GI, 2016) (DGK. GI, 2017)

Ans.

Inhalation	Exhalation
i. The intake of fresh air into the lungs for gaseous exchange is called inhalation.	i. The removal of consumed air out of the lungs, after gaseous exchange has occurred, is called exhalation.
ii. Inhalation is also termed as inspiration.	ii. Exhalation is also termed as expiration.

7. Name the structure involved in gaseous exchange in earthworm, fish and frog. (DGK. GII, 2016)

Ans.

Animals	Structures for gaseous exchange
Earthworm	Skin
Fish	Gills
Frog	Skin, lungs and buccal chamber

8. What is cutaneous respiration? (LHR. GII, 2015)

Ans. Cutaneous Respiration: The gaseous exchange through the skin is known as cutaneous respiration.

9. Give one difference between Alveoli and Parabronchi. (SWL. GI, 2016)

Ans.

Alveoli	Parabronchi
Any of the tiny, blind-ended cavities in lungs in which gas exchange takes place in humans.	In the lungs of birds, tiny thin walled ducts called parabronchi are present which are open both ends and the air is constantly ventilated gaseous exchange.

10. Define Parabronchi and Bronchioles. (SWL. GI, 2016) (SGD. 2016)

Ans. Parabronchi: In the lungs of birds, tiny thin walled ducts called parabronchi are present. These parabronchi open at both ends and the air is constantly ventilated. The walls of parabronchi are main sites of gaseous exchange.

Bronchioles: When the smaller bronchi in humans attain a diameter of one mm or less then they are called bronchioles. Bronchioles are made up of mainly circular smooth muscles.

11. Name different parts of air passage way of man. (DGK. GII, 2015) (RWP. GII, 2017)

Ans. Parts of air passage way of man:

i. Nostrils
ii. Nasal cavities
iii. Pharynx
iv. Larynx
v. Trachea
vi. Bronchi
vii. Bronchioles
viii. Alveolar ducts
ix. Alveolar sacs or Alveoli.

12. **Distinguish between Stomata and Lenticels.** (BWP. GI. 2014)

Ans.

Stomata	Lenticels
Stomata are main sites of exchange of gases in plants. Largely stomata are present in the leaves but these are also present in the young stem.	Lenticels are the special pores in the cork tissue in the stem below the epidermis. Lenticels are involved in gaseous exchange.

13. **What is larynx or voice box?** (MLN. GI. 2014) (MLN. GI. 2015) (LHR. GI. 2018) (SWL. 2019)

Ans. **Larynx:** Larynx is a complex cartilaginous structure surrounding the upper end of trachea. The opening of the larynx is called glottis which is covered by an automatically controlled lid called epiglottis to prevent the entry of food or liquids into the larynx. Due to presence of vocal cords in larynx, it is also known as voice Box.

14. **What is vocal cord? Give its function:**

(SGD. GI. 2014) (AJK. GI. 2015) (MLN. GI. 2016) (MLN. GI. 2017)

Ans. **Vocal Cord:** In the glottis, the mucous membrane is stretched across into two thin edged fibrous bounds is called vocal cords.

Function of Vocals Cords: Vocal cords help in voice production, when vibrated by air during exhalation.

15. **Name Respiratory Pigment of Muscle and give its role.** (SWL. GII. 2016)

Ans. **Respiratory Pigment of Muscle:** The name of respiratory pigment of muscle is Myoglobin.

Role of Myoglobin:

i. Myoglobin serves as in intermediate compound for the transfer of oxygen from blood to tissues.

ii. Myoglobin stores some oxygen in the tissues until it is utilized during metabolism.

16. **Differentiate between diaphragm and pleura.**

(LHR. GI. MLN. GI. 2014) (LHR. GII. DGK. GII. BWP. GI. 2015)
(MLN. GI. DGK. GII. 2016) (MLN. GI. BWP. GI. 2017) (BWP. DGK. GI. AJK. 2018)

Ans.

Diaphragm	Pleura
The floor of the chest cavity is called diaphragm. Diaphragm is a sheet of skeletal muscle which separates chest cavity from abdominal cavity.	Lungs are covered with double layered thin membranous sacs called pleura.

17. **Define the term alveoli and air sac.** (GRW. GI. 2016)

Ans. **Alveoli:** Alveoli are any of the tiny, blind-ended cavities in lungs in which gas exchange takes place in humans.

Air Sac: The lungs of birds have developed several extensions known as air sacs, which reach all parts of the body and even penetrate some of the bones.

The inflated air sacs act as bellows and send air into the parabronchi for gaseous exchange.

18. **What is the role of surfactant in respiratory distress syndrome?**

(GRW. GI. 2014) (GRW. GII. 2015)

Ans. **Role of Surfactant in Respiratory Distress Syndrome:** Surfactant reduces the tendency of the lungs to collapse as it is a mixture of lipoprotein molecules produced by the secretory cells of the alveolar epithelium which forms a layer over the surface of the fluid within the alveoli to reduce the surface tension. In the absence of surfactant, respiratory distress syndrome is developed.

19. **What is the mechanism of inhalation of air in man?** (SWL. GI, 2017) (GRW, 2018)

Ans. The moving of the fresh air in the lungs is called inspiration. The space inside the chest cavity is increased during inspiration. This space is increased by two ways:

(a) The muscles of ribs contract and elevate the ribs upward and forward.

(b) The muscles of the diaphragm also contract and diaphragm becomes less domelike.

These two movements increase the volume of chest cavity. It reduces pressure in the chest cavity. When the pressure in the lungs is decreased, the lungs expand. The expansion of the lungs creates a vacuum in the lungs. There is higher atmosphere pressure outside. So air rushes into the lungs from outside. This is called inspiration.

20. **What is mechanism of exhalation in man?** (FBD. GI, 2017)

Ans. Expiration: The removal of the consumed air from the lungs is called expiration. The space in the chest cavity is reduced by two ways:

i. The intercostals muscles of the ribs are relaxed during expiration. Therefore, the ribs move downward and inward. So the space in the sides of the chest cavity is reduced.

ii. At the same time, the muscles of the diaphragm are relaxed and the diaphragm becomes more domelike. So the chest cavity is also reduced from the floor.

This reduction in the space of the chest cavity exerts pressure on the lungs. This pressure presses the lungs and the air inside lungs moves out of the lungs. This is called expiration.

21. **Write down carbon dioxide concentration in arterial and venous blood.** (SGD. GII, 2015) (SGD. GI, 2016) (LHR. GII, FBD. GI, MLN. GI, 2017) (LHR. GI, DGK. GII, 2018)

Ans. **CO_2 Percentage in Arterial Blood:**

Arterial blood contains about 50 ml of CO_2 per 100 ml in arterial and venous blood.

CO_2 Percentage in Venous Blood:

Venous blood contains about 54 ml of CO_2 per 100 ml of blood.

22. **How does temperature affect the oxygen carrying capacity of hemoglobin?** (BWP. GI, 2014) (BWP. GI, 2015) (DGK. GII, 2018) (MLN. GII, 2019)

Ans. **Effect of Temperature on Transport of oxygen**

Increase in temperature decreases the oxygen carrying capacity of hemoglobin in the blood.

Example: Oxygen Carrying capacity of hemoglobin decreases in increased muscular activity.

23. **How does carbon dioxide concentration affect the oxygen carrying capacity of blood Hemoglobin?** (GRW. GI & GII, 2016) (DGK. GII, 2017)

Ans. **Effect of CO_2:** When carbon dioxide pressure increases, the oxygen tension decreases, the capacity of hemoglobin to hold oxygen becomes less. In this way increased carbon dioxide tension favours the greater liberation of oxygen from the blood to the tissue.

24. **Write at least two different states of CO_2 transportation in blood.** (DGK. GI, 2017)

Ans. The blood transports the carbon dioxide in different states:

i. **Carboxyhaemoglobin:** About 20% of the carbon dioxide is carried as carboxyhaemoglobin. The carbon dioxide combines with the amino group of the haemoglobin and forms carboxyhaemoglobin.

ii. **Plasma Protein:** The other plasma proteins carry about 5% of carbon dioxide.

25. **Where carbonic anhydrase enzyme is present? Give its role.** (GRW. GI, 2017)

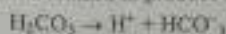
Ans. About 70% carbon dioxide is carried as bicarbonate ions. These bicarbonate ions combine with sodium in the plasma.

i. **Reaction at tissues:** The carbon dioxide enters into the capillaries from the tissue

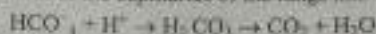
fluid. It combines with water to form carbonic acid.

$$CO_2 + H_2O \rightarrow H_2CO_3$$

This carbonic acid splits quickly and ionized to produce hydrogen ions and bicarbonate ions.

$$H_2CO_3 \rightarrow H^+ + HCO^-_3$$

When blood leaves the capillary bed of the tissues, most of the carbon dioxide is present in the form of bicarbonate ions. All the reactions are reversible.

ii. **Reactions of lungs:** The bicarbonate ions combine with hydrogen ions to form carbonic acid in the lungs. This carbonic acid splits to form water and carbon dioxide. This carbon dioxide diffuses out of the capillaries of the lungs into the space of the alveolar sac.

$$HCO^-_3 + H^+ \rightarrow H_2CO_3 \rightarrow CO_2 + H_2O$$

A small amount of carbon dioxide (in the form of carbohydrates) is also carried by corpuscles (RBC). These carbohydrates combine with potassium.

26. What is pulmonary tuberculosis? Write down its causes.

(GRW. GI, 2016) (MLN. GI, 2017) (LHR. GII, MLN. GII, 2019)

Ans. Pulmonary Tuberculosis: Pulmonary tuberculosis is disease of lungs in which inside of the lung is damaged resulting in cough and fever. It is a contagious disease.

Causes:

i. Tuberculosis is caused by a bacterium Mycobacterium Tuberculosis.

ii. Tuberculosis is more common in poor people.

iii. Malnutrition and poor living conditions facilitate Mycobacterium to grow.

27. What is asthma? Give its two causes.

(LHR. GII, FBD. GI, BWP. GI, 2015) (SGD. GI, DGK. GI, 2016) (LHR. GII, FBD. GI, BWP. GII, 2017) (FBD. GI, SGD. GII, AJK. 2019)

Ans. Asthma: Asthma is a serious respiratory disease associated with severe paroxysm of difficult breathing, usually followed by a period of complete relief, with recurrence of attack at more or less frequent intervals. **Causes:** Following are main causes of Asthma:

i. Asthma is an allergic reaction to pollen, spores, cold, humidity, pollution etc, which manifests itself by spasmodic contraction of small bronchioles tubes.

ii. Asthma results in the release of inflammatory chemicals such as histamines into the circulatory system that cause severe contraction of the bronchioles.

28. What is Myoglobin? Describe also its function:

(FBD. GI, 2014) (GRW. GII, 2016) (LHR. GII, 2017) (SGD. 2019)

Ans. Myoglobin: Myoglobin is hemoglobin-like iron containing protein pigment occuring in muscle fibers. Myoglobin is also known as muscle hemoglobin.

Functions of Myoglobin:

i. Myoglobin serves as an intermediate compound for the transfer of oxygen from hemoglobin to aerobic metabolic process of the muscle cells.

ii. Myoglobin can also store some oxygen.

29. How haemoglobin differ from myoglobin?

(SGD. GI, 2015) (FBD. GI, 2016) (MLN. GII, 2017) (MLN. GII, 2019)

Ans.

Myoglobin	Haemoglobin
i. Myoglobin consist of just one polypeptide chain associated with an iron containing ring structure which	i. Hemoglobin consists of four polypeptide chain associated with an iron containing ring structure which can

can bind with one molecule of oxygen.	bind with four molecules of oxygen.
ii. The affinity of myoglobin to combine with oxygen is much higher as compared to hemoglobin	ii. Hemoglobin in man increases the oxygen carrying capacity of the blood to about 75 times.

30. When the lungs are fully inflated, What is the total inside the capacity of lungs? (BWP, GI, 2018)

Ans. Lung Capacities: When the lungs are fully inflated in an adult human being, the total inside capacity of lungs is about 05 Liters.

31. Differentiate between inhaled and exhaled air composition. (SWL, SGD, RWP, 2018) (DRW, 2018) (LHR, GI & GII, AJK, GI, 2016) (RWP, GII, 2017)

Ans.

	Inhaled %	Exhaled %
Oxygen	21	16
Carbon dioxide	0.04	04
Water vapours	Variable	Saturated
Nitrogen	79	79

32. What are the important factors which affect the capacity of hemoglobin to combine with oxygen? (LHR, GI, 2018)

Ans. Factors Affecting the Oxygen:

Combining Capacity of Haemoglobin: There are three important factors which affect the capacity of haemoglobin to combine with oxygen.

Carbondioxide: When carbondioxide pressure increases, the oxygen tension decreases, the capacity of haemoglobin to hold oxygen becomes less. In this way increased carbon dioxide tension favours the greater liberation of oxygen form the blood to the tissue.

Temperature: Rise in temperature also causes a decrease in the oxygen carrying capacity of blood, e.g., in the increased muscular activity.

pH: The pH of blood also influences the degree to which oxygen binds to haemoglobin. As the pH of the blood declines, the amount of oxygen bound to haemoglobin also declines. Conversely an increase in blood pH results in an increased ability of haemoglobin to bind oxygen.

33. What is the rate of breathing at rest and during exercise? (DGK, GI, 2016) (MLN, GI, 2017) (LHR, GII, 2018)

Ans. Rate of breathing at Rest: During rest breathing occurs rhythmically ate the frequency of 15 or 20 time per minute in human beings.

Rate of breathing during Exercise: During exercise breathing occurs 40 – 50 breaths per minute.

34. Differentiate between inspiration and expiration. (FBD, MLN, GI, 2018)

Ans. Inspiration: During inspiration the space inside the chest cavity is increased by two ways.

i. The muscles of ribs contract and elevate the ribs upwards and forwards.

ii. The muscles of diaphragm contract and diaphragm becomes less domelike.

In the result of this downward movement of diaphragm and outward and upward movement of the ribs, the pressure from the lungs is released.

When the pressure from the lungs is removed they expand. With the expansion of the lungs vaccum is created inside the lungs in which the air rushes from the outside due to higher atmospheric pressure. This is inspiration.

Expiration: During expiration the muscles of ribs become relaxed. With the relaxation of

muscles the ribs settle down. When the ribs settle down they move downward and inward. In this way from the side of chest cavity the space becomes less. At the same time the muscles of the diaphragm becomes more domelike. In the result of the change in shape of the diaphragm the space in the chest cavity is also reduction from the floor as well. This reduction in space of the chest cavity exerts pressure on the lungs. When lungs are pressed the inside air moves out. This is expiration.

35. Differentiate between Haemoglobin and Oxyhaemoglobin. (MLN, GI, 2018)

Ans.

Haemoglobin	Oxyhaemoglobin
Haemoglobin is the most important protein present in many animals including man. It in man increases the oxygen carrying capacity of the blood to about 75 times.	Oxygen combines with hemoglobin in the red blood cells of the pulmonary capillaries, to produce oxyhaemoglobin. As this oxygenated blood circulates through the tissues, it release oxygen where its concentration is less. After releasing the oxygen the oxyhaemoglobin which now become hemoglobin returns to the lungs again in deoxygenated blood.

36. What are the symptoms of Asthma? (MLN, GI, 2018) (SWL, 2019)

Ans. Symptoms of Asthma: Asthma is a serious respiratory disease associated with severe paroxysm (sudden attack or outburst of coughing) of [illegible], usually followed by a period of complete relief, with recurrence (repetition) of attack at more or less frequent intervals.

37. In hot and dry season, level of O_2 rises inside the leaf. Give its reasons. (MLN, GIL, 2018)

Ans. In hot and dry day the level of oxygen inside the leaf rises. This is because the stomata close to prevent the loss of water.

38. Write down properties of respiratory surfaces in animals. (MLN, GRI, SWL, AJK, 2018) (SWL, 2019)

Ans. Properties of Respiratory Surface in Animals: Respiratory surfaces in animals are the sites where gaseous exchange takes place. The respiratory surfaces in most animals show following features.

i. **Large Surface:** The surface area should be extremely large as it is seen in the lungs in the land vertebrates and in the gills in case of fishes.

ii. **Wet Surface:** The respiratory surface must be wet in order to carry out diffusion of gases.

iii. **Thin Epithelium:** The distance across which diffusion has to take place should be little. In most animals the epithelium which separates air and blood is only two called [illegible] thick. So the distance for diffusion is very short.

Ventilation: Ventilation maintains a steep diffusion gradient. There is a big difference in the concentration of the gases at two points which brings about diffusion.

Capillary Network: The respiratory site should possess extensive network of capillaries through which blood can pass at an adequate speedd. In this way complete diffusion gradient is maintained which helps in rapid diffusing of oxygen.

39. Give role of respiratory pigments. (SGD, 2018)

Ans. Role of Respiratory Pigments: Respiratory pigments of various types are present in different animals. The respiratory pigment combines with oxygen reversibly and increases the oxygen carrying capacity of the blood.

40. **What are alveoli? Give their function.** (SGD. 2018)

Ans. Alveoli: The bronchioles continue to divide and subdivide deep into the lungs and finally open into a large number of air-sacs. In fact air-sac is the functional unit of the lungs. Each air-sac is like a cluster of grapes and consists of several microscopic single layered structures called alveoli.

Function of Alveoli: The alveoli are surrounded by a rich network of blood capillaries to produce an excellent site for the exchange of gases.

41. **How pH and temperature effect capacity of haemoglobin to combine with oxygen?** (RWP. 2018) (MLN. GI. 2018)

Ans. Effect of pH on Capacity of Haemoglobin to Combin with Oxygen: The pH of blood influences the degree to which oxygen binds to haemoglobin. As the pH of the blood declines, the amount of oxygen bound to haemoglobin also declines.

Conversely an increase in blood pH results in an increased ability of haemoglobin to bind oxygen.

Effect of Temperature on Capacity of Haemoglobin to Combine with Oxygen: Rise in temperature also causes a decrease in the oxygen carrying capacity of blood, e.g., in the increased muscular activity.

42. **Write down the disadvantages of gas exchange in water environment?** (DGK. GII. 2018)

Ans. Disadvantages of gas exchange in water environment:

More dense: Breathing or ventilation of water is far more difficult than the ventilation of air. Because water is 8000 times more dense than air.

More Viscous: In terms of viscosity the water is 50 times more viscous, which makes it more difficult for exchange of gases, as compared to air.

43. **Define Parabronchi and its role in birds.** (RWP. 2018)

Ans. Parabronchi: In the lungs of birds, tiny thin walled ducts are present called the parabronchi.

Role: These parabronchi are open at both ends and the air is constantly ventilated. The walls of the parabronchi are chief sites of gaseous exchange. The direction of the blood flow in the lungs is opposite to the air flow through the parabronchi. This counter current exchange increase the amount of oxygen which enters the blood.

44. **What are stomata? Give one function** (AJK. 2018)

Ans. Stomata: Stomata are tiny opening or pores found on the under surface of plant leaves.

Function of Stomata: Stomata facilitates gas exchange. Stomata open and close to allow the intake of carbon dioxide and the release of oxygen, which helps in the photosynthesis.

45. **Why ventilation in water is far more difficult than air?** (LHR. GII. 2018)

Ans: Reason: Breathing or ventilation is directly involved in the exchange of gases. The ventilation of water is for more difficult than the ventilation of air, because water is 8000 times more dense than air.

46. **Describe lung capacities.** (FBD. GII. 2018)

Ans. Lung Capacities: The lung capacities are measurement of two or more volumes. The vital capacity measures the maximum amount of air that can be inhaled or exhaled during a respiratory cycle. It is the sum of the expiratory reserve volume, tidal volumes and

inspiratory reserve.

47. Define breathing. (MLN. GI. 2019)

Ans. Breathing: Breathing is a process in which fresh air containing more O_2 is pumped into the lungs and air with CO_2 is pumped out of the lungs. In other words, breathing is a mechanical process consists of two phases:

☆ Inspiration ☆ Expiration

48. What is source of Oxygen during photosynthesis? (MLN. GII. 2019)

Ans. Source of O_2: The source of oxygen released during photosynthesis in plants in the water.

49. What is the use of Spectrophotometer? (MLN. GII. 2019)

Ans. Spectrophotometer: Pigments are the substance that absorb visible light (380 - 750)nm in wave length. Different pigments absorb light of different wave lengths (colour) and the wave lengths are absorbed disappear. An instrument called spectrophotometer is used to measure relative ability of differet pigments to absorb different wave lengths of light.

50. How much Carbon dioxide is present in venous and arterial blood? (MLN. GII. SGD. 2019)

Ans. CO_2 percentage in Arterial Blood: Arterial blood contains about 50ml of CO_2 per 100 ml in arterial and venous blood.

CO_2 percentage in Venous Blood: Venous blood contains about 54ml of CO_2 per 100 ml of blood.

51. Differentiate between breathing and cellular respiration. (FBD. DGK. GI. 2018) (RWP. 2019)

Ans. Differences between breathing and cellular respiration:

Breathing	Cellular Respiration
i. Breathing is a mechanical process in which our is sent to the lungs while removing CO_2 from the body. By muscular movement.	i. Respiration is a cellular process in which simple organic compound like glucose are oxidized in order to liberate chemical energy in the form of ATP.
ii. A physical process	ii. A biochemical process
iii. Occurs by diffusion	iii. Occurs by oxidation
iv. Extracellular process	iv. Intracellular process

52. What are causes and symptoms of pulmonary tuberculosis? (DGK. 2019)

Ans. Causes of Symptom: Pulmonary tuberculosis is a disease of lungs in which inside of lungs is damaged resulting in cough and fever. It is common in poor people.

Tuberculosis general name is T.B of a group of disease cause by Mycobacterium tuberculosis.

ESSAY TYPE QUESTIONS

Q1. Define photorespiration. Explain its phenomenon. (GRW. GI. 2015)

Q2. Explain inspiration and expiration in man. (SGD. GI. 2019)

CHAPTER 14

Transport

MULTIPLE CHOICE QUESTIONS (MCQ's)

1. The roots of prosopis tree may penetrate deep in the soil upto: (LHR. 2014) (RWP. GI. 201
   (A) 5 m (B) 25 m (C) 50 m (D) 70 m
2. Which of the following artery supplies blood to heart muscles? (LHR. GII. 201
   (A) Pulmonary (B) Coronary (C) Systemic (D) None of these
3. Casparian strips are present in the cells of root: (MLN. GI. 2014) (LHR. GI, DGK. GII, 201 (LHR. GI, DGK. GII. 2016) (RWP. GII. 2017) (GRW. 2015) (RWP. 201
   (A) Endodermis (B) Epidermis (C) Cortex (D) Pith
4. Cytoplasmic strands that extend through pores in adjacent cell wall are: (MLN. GI. 201
   (A) Plasmodesmata (B) Plasmofibre
   (C) Plasmofilament (D) Plasmostrand
5. Casparian strips are present in: (RWP. GI. 2014) (GRW. GI. 201
   (A) Cortex cells of Roots (B) Endodermis cells of roots
   (C) Cells of pericycle (D) Cells of xylem vessels
6. Which one of the following animal has closed blood circulatory system? (LHR. GI, 201
   (A) Snail (B) Octopus (C) Insect (D) Spider
7. Histamine is produced by: (LHR. GII. 2017) (FBD. GII. 201
   (A) Neutrophils (B) Eosinophils (C) Basophils (D) Monocytes
8. Disorder in which haemoglobin molecules have F chain instead of B chain is known as: (LHR. GI. 201
   (A) Thalassaemia (B) Leucaemia (C) Oedema (D) Emphysema
9. Cerebral infarction is also known as: (LHR. GII. 201
   (A) Stroke (B) Heart attack (C) Hemorrhage (D) Hypertension
10. The condition cause narrowing and hardening of arteries is called: (LHR. GI. 201
    (A) Atherosclerosis (B) Necrosis (C) Sclerosis (D) Apotosis
11. Active transport is selective and is dependent on: (AJK. GI. 201
    (A) Nutrition (B) Respiration (C) Digestion (D) Circulation
12. The concentration of plasma in the blood is: (SGD. GI. 2014) (AJK. GI. 201
    (A) 45 % (B) 50 % (C) 55 % (D) 60 %
13. Liver receives blood from digestive system through: (SGD. GII. 201
    (A) Portal vein (B) Hapatic vein
    (C) Iliac vein (D) Hepatic portal vein
14. The volume of dry seed may increase up to 200 times after absorbing water by: (LHR. GI. 2014) (RWP. GI. 2015) (RWP. 201
    (A) Diffusion (B) Imbibition (C) Osmosis (D) Active transport

15. **The exchange of food material takes place through:** (SGD. GI, 2016)
(A) Capillary (B) Vein (C) Artery (D) Heart

16. **The pairs of lateral hearts in Earthworm are:** (SGD. GII, 2016)
(A) 4 or 5 (B) 5 or 6 (C) 6 or 7 (D) 7 or 8

17. **The phenomenon associated with root pressure is:** (BWP. GI, 2016)
(A) Imbibition (B) Cohesion (C) Guttation (D) Tension

18. **The upward movement of sap through the xylem is:** (AJK. GI, 2016)
(A) Ascent of sap (B) Plasmolysis (C) Deplasmolysis (D) Guttation

19. **Loss of liquid water through water secreting glands is called:** (SGD. GI, 2016)
(A) Guttation (B) Transpiration
(C) Imbibition (D) Translocation

20. **Blood is not involved in transport of gases in:** (BWP. 2019)
(A) Frog (B) Fish (C) Insects (D) Man

21. **The heart of fish work as:** (LHR. GII. 2019)
(A) Double circuit heat (B) Single circuit heart
(C) Closed circuit heart (D) None of these

22. **The cells of phloem that conduct sugars and organic material throughout the plant are known as:** (MLN. GII, 2014)
(A) Xylem (B) Sieve cells (C) Stylets (D) Guard cells

23. **Narrowing and hardening of arteries is:** (MLN. GII. 2018)
(A) Atherosclerosis (B) Collapsing (C) Thickening (D) None

24. **The ions involved in the opening and closing of stomata are:** (GRW. GI, 2014) (GRW. GII, 2015) (LHR. GII. 2016)
(A) Sodium (B) Calcium (C) Potassium (D) Magnesium

25. **Which of the following processes cause substances to move across membranes without the expenditure of cellular energy?** (MLN. GI, 2016)
(A) Endocytosis (B) Active transport
(C) Diffusion (D) None of these

26. **Temperature causes closure of stomata:** (DGK. GI, 2015) (BWP. 2018)
(A) 30-40°C (B) 30-35°C (C) 25-35°C (D) 40-45°C

27. **Which of the following is not true for guard cells?** (GRW. GII, 2016)
(A) Present in epidermis (B) Bean like
(C) Lack chloroplast (D) Kidney shaped

28. **Which one contains companion cells?** (GRW. GI, 2014)
(A) Xylem (B) Phloem (C) Endodermis (D) Cortex

29. **The cells which supply ATP and proteins to sieve tubes are:** (LHR. GI, 2015)
(A) Companion (B) Epidermal (C) Tracheids (D) Vessels

30. **The pressure flow theory was first proposed in 1930 by:** (SGD. GI, 2016) (AJK. 2019)
(A) Ernst Hackel (B) Ernst Munch (C) Hemming (D) Dixon

31. **The most abundant compound in blood plasma is:** (MLN. GII, 2016)
(A) NaCl (B) Albumin (C) Water (D) Globulin

32. **The weight of the blood in our body is about of our body:**
(A) 1/6th (B) 1/5th (C) 1/12th (D) 1/20th

33. **Which one is not involved in clotting of blood?**
(A) Platelets (B) Erythrocytes (C) Basophils (D) Eosinophils

34. **Normal pH of human blood is:**
(A) 4.4 (B) 5.4 (C) 6.4 (D) 7.4

35. __________ **is an example of Agranulocytes.**
(A) Eosinophils (B) Basophils (C) Neutrophils (D) Monocytes

36. **Which of the following is not true about histamine?**
(A) Produced by basophills (B) Cause inflammation
(C) Causes dilation of blood capillaries (D) Released by Eosinophils

37. **Platelets are fragments of large cells called:**
(A) Microkaryocytes (B) Erythrocytes
(C) Megakaryocytes (D) Leucocytes

38. **One cubic millimeter of human male blood contains RBC**
(A) 4-4.5 millions (B) 5-5.5 millions (C) 6-6.5 millions (D) 3-3.5 millions

39. **The lymph vessels open into:** (MLN. GI, 2015)
(A) Arteries (B) Arterioles (C) Capillaries (D) Veins

40. **In normal human body percentage of plasma in blood volume is:** (DGK. GII, 2017)
(A) 45% (B) 30% 55% (D) 60%

41. **Blood provides immunity by:** (BWP. GI, 2016)
(A) Leukocytes (B) Platelets (C) RBC (D) Lymphocytes

42. **The mutual holding of water molecules to form solid chain-like column in xylem is due to bonds:** (MLN. GII 2014)
(A) Ionic (B) Hydrogen (C) Covalent (D) Ester

43. **Platelets are not cells, but are fragments of large cells called:** (AJK. GI, 2017)
(A) Microkaryocytes (B) Karyocytes
(C) Megakaryocytes (D) Karyokinesis

44. **A substance that inhibits blood clotting is:** (MLN. GI, 2017)
(A) Heparin (B) Fibrinogen (C) Fibrin (D) Thrombin

45. **Which is found in herestitial fluid?** (FBD. GI, 2014)
(A) Large Proteins (B) White Blood Cells
(C) Red Blood cells (D) Platelets

46. **Which one of following is not cell but the fragment of large cells?** (SWL. GI, 2017)
(A) Basophils (B) Leucocytes (C) Platelets (D) Erythrocytes?

47. **The renal vein brings the impure blood form:** (LHR. GII, 2015)
(A) Brain (B) Kidney (C) Lungs (D) Liver

48. **Liver receives blood from digestive system through:** (SGD. GII, 2015)
(A) Portal vein (B) Hepatic Vein
(C) Iliac Vein (D) Hepatic Portal Vein

49. **Antiserum is a serum containing:** (L.HR. GI, 2017) (MLN. GII, 2019)
(A) Hormones (B) Antigen (C) Enzyme **(D)** Antibodies

50. **Type of blood cells which stay from 10-20 hours in blood and then enter in tissues andbecome macrophages are called:** (MLN. GII, 2019)
(A) Monocytes (B) Lymphocytes (C) Basophils (D) Neutrophils

51. **The uncontrolled production of white blood cells result in:** (LHR. GII, 2015) (RWP. GI, 2017)
(A) Leucaemia (B) Thalassaemia (C) Oedema (D) Asthma

52. **Hemoglobin Molecule in most cases, does not have Beta-chain in it, instead Y-chain is present in:** (KTHS GI, 2015)
(A) Oedema (B) Leucaemia **(C)** Thalassemia (D) Anaemia

53. **The heart is enclosed in a double membranous sac, the.** (LHR. GI, 2014) (LHR. GI, 2016)
(A) Pleural Cavity (B) Abdominal Cavity
(C) Thoracic Cavity **(D)** Pericardial Cavity

54. **Which one is not the layer of wall of heart?** (RWP. GII, 2014)
(A) Pericardium (B) Epicardium (C) Myocardium (D) Endocardium

55. **One complete heart beat consists of one systole and one diastole, and last for about:** (DGK. GI, 2014)
(A) 1.0 seconds **(B)** 0.8 seconds (C) 0.5 seconds (D) 0.2 seconds

56. **In the embryonic life red blood cells are formed in the:** (LHR. GI, 2016) (MLN. GI, 2014)
(A) Bone marrow and vertebrae **(B)** Liver and spleen
(C) Heart and bone marrow (D) Sternum and ribs

57. **A condition of high blood pressure is known as:** (RWP. GI & GII, 2014)
(A) Hypotension (B) Haemorrhage
(C) Hypertension (D) Arteriosclerosis

58. **Match heart attack with one of the followings:** (RWP. GI, 2015)
(A) Stroke (B) Oedema
(C) Hypertension **(D)** Myocardial Infarction

59. **Which one of following is present in interestitial fluid:** (SGD. GI, 2014)
(A) Red Blood Cells **(B)** White Blood Cells
(C) Platelets (D) Large proteins molecules

60. **Passive immunity is developed by Injecting:** (MLN. GII, 2017) (LHR. GI, 2018)
(A) Vaccine (B) Serum (C) Antiserum **(D)** Antibiotic

61. **The valves present in the veins are:** (AJK. GI, 2014) (DGK. GII, 2016) (RWP. 2019)
(A) Bicuspid (B) Tricuspid **(C)** Semi lunar (D) Aortic

62. **Veins are the blood vessels which transport blood from body cells towards:** (DGK. GI, 2016)
(A) Brain (B) Kidney (C) Liver **(D)** Heart

63. **Discharge of Blood from Blood vessel is called as:** (SGD. GI, 2014) (DGK. GII, 2017) (RWP. 2018)
(A) Stroke (B) Heart attack (C) Thrombosis **(D)** Hemorrhage

64. **Avearage life span of Red Blood C[illegible]** (DGK. GI, 2015)
(A) 2 months (B) 3 month[illegible] [illegible] 6 months **(D)** 4 months

65. **The type of white blood cells which destroys small particles by phagocytosis:** (SWL. GI, 2018)
(A) Eosinophil (B) Basophil (C) Monocyte **(D) Neutrophil**

66. **The white blood cells which have life span of months or even years are:** (DGK. GII, 2018)
(A) Lymphocytes (B) Monocytes (C) Basophils (D) Eosinophils

67. **Enlargement of spleen is seen in:** (LHR. GII, 2018)
(A) Blood cancer **(B) Thalessaemia** (C) Odema (D) Hepatitis

68. **Thalassaemia is also called :** (LHR. GII, 2018)
(A) Cooley's anaemia (B) Thomas anaemia
(C) Peter's anaemia (D) Mendl's anaemia

69. **In hydra ectodermal cells get food from endodermal cells by** (GRW, 2018)
(A) osmosis **(B) diffusion**
(C) active transport (D) facilitated diffusion

70. **The left systemic arch disappears in:-** (MLN. GII, 2018)
(A) Amphibians **(B) Birds** (C) Reptiles (D) Fishes

71. **Antibodies are produced from** (SGD, 2018)
(A) Eosinophils (B) Basophils (C) Monocytes **(D) Lymphocytes**

72. **Roots bear a dense cluster of tiny hair like structures which are extensions of** (DGK. GII, 2018)
(A) Epidermal cells (B) Pericycle cells
(C) Endodermal cells (D) Cortical cells

73. **Which of the following vertebrates posses single circuit heart** (DGK. GII, 2018)
(A) Reptiles (B) Birds (C) Mammals **(D) Fishes**

74. **Prosopis trees of leguminoseae family have maximum depth of their roots:** (AJK. 2018)
(A) 50 meters **(B) 60 meters** (C) 70 meters (D) 80 meters

75. **Basophils produce a substance that inhibits blood clotting.** (LHR. GII, SWL. 2019)
(A) Heparin (B) Platelets (C) Fibrinogen (D) Eosinophil

76. **Of the total volume of leaf air spaces may comprises:** (SWL. 2019)
(A) 40% (B) 20% (C) 10% (D) 30%

77. **Lenticels are aerating pores formed in the:** (SGD, 2019)
(A) Bark (B) Epidermis (C) Endodermis (D) Pericycle

78. **The number of chloroplast in each mesophyll cell is about:** (RWP, 2019)
(A) 10-100 (B) 10-200 **(C) 20-100** (D) 20-200

79. **Apoplast pathway becomes discontinuous in endodermis due to:** (DGK. 2019)
(A) Pericycle **(B) Casparian strip** (C) Cortex (D) Xylem

80. **Atrioventricular valve present in left side of heart is:** (DGK. 2019)
(A) Tricuspid **(B) Bicuspid** (C) Pulmonary valve (D) Semilunar

SHORT ANSWER QUESTIONS

1. ***State pressure flow theory.***

Ans. Pressure flow theory: It is the most acceptable theory for the transport in the phloem of angiosperms. The hypothesis was first proposed by Ernst munch in 1930. (LHR. GII, 2015)
This theory states that "The flow of solution in the sieve elements is driven by an osmotically generated pressure gradient between source and sink".

The following steps explain the pressure flow theory.

i. Use of glucose and formation of sucrose

ii. Active transport of sucrose

iii. Movement of water to sieve tube

iv. Hydrostatic pressure and movement of sucrose to sinks.

v. Movement of water from sieve tube

vi. Generation and maintenance of a substantial pressure gradient.

2. Differentiate between diffusion and osmosis. (GRW. GI, 2018) (MLN. GI, 2017)

Ans.

Diffusion	Osmosis
i. Diffusion is the movement of molecules from an area of its high concentration to an area of its low concentration.	i. The diffusion of water through a semi permeable membrane in response to distribution of osmolytes is known as osmosis.
ii. Diffusion is a non facilitated active transport "	ii. Osmosis is a non- facilitated active transport related to water only.

3. What is pulmonary circulation? (LHR. GII, 2016)

Ans. Pulmonary circulation: The circulation of deoxygenated blood by pulmonary arch from right ventricle to lungs, and the oxygenated blood from lungs to left auricle (atrium) via pulmonary veins is called pulmonary circulation.

4. Give the role of platelets. (RWP. GI, 2014) (LHR. GI, 2016)

Ans. Role of platelets: The main function of platelets is blood clotting. In this process they cause conversion of fibrinogen, a solid plasma protein, into insoluble form, fibrin. The fibrin thread enmesh (catch) red blood cells and other platelets in the area of damaged tissue, ultimately forming a blood clot. The clot serves as a temporary real to prevent bleeding until the damaged tissue can be repaired.

5. Differentiate between cohesion and adhesion. (LHR. GI, 2014)

Ans.

Cohesion	Adhension
It is the force of attraction among water molecules. It holds water together, forming a solid chain-like column within the xylem tubes. The water molecules form hydrogen bonds between the molecules.	The force of attraction between water molecules and the cells is called adhesion. The water molecules adhere to the walls of xylem so that the column of water in xylem tissue does not break. The composition of cell wall provides necessary adhesion to water molecules that helps water creep up. The cellulose component of cell wall especially has great affinity with water. It can imbibe (absorb) water.

6. Differentiate between apoplast and symplast pathway.
(GRW. GI, RWP. GI, 2014) (GRW. GII, FBD. GI, AJK. GI, 2015) (LHR. GI, 2016) (RWP. 2018)

Ans.

Apoplast Pathway	Symplast Pathway
i. In a plant root, the compartment made up of all extracellular spaces, along with the spaces within cell walls that water can traverse without crossing any plasma membrane.	i. Symplast pathway is a system of interconnected protoplasts in the root cells in which cytoplasm of neighboring cells is connected with one another by plasmodesmata.
ii. Apoplast pathway is of greater important for both water and solutes.	ii. Symplast pathway is less important, except for salts in the region of the endodermis.

(DGK. GII. 2014)

7. **What is facilitated diffusion? Give its function.**

Ans. Facilitated Diffusion: In facilitated diffusion, carrier molecules within the cell membrane transport nutrients across the membrane. These carrier molecules are proteins which are present within cell membrane of epidermal and other root cells.

Function of facilitated Diffusion: Some nutrients are carried from the soil to the epidermal cells of roots through their cell membrane by facilitated diffusion.

(LHR. GII. 2014)

8. **Differentiate between an artery and a vein.**

Ans.

Artery	Vein
An artery is a blood vessel which transports blood away from the heart to the various parts of the body through capillaries. It usually carries oxygenated blood except pulmonary artery which carries deoxygenated blood.	A vein is a blood vessel which collects blood from body through capillaries and transports it towards heart. It usually carries deoxygenated blood except pulmonary vein which carries oxygenated blood.

9. **Differentiate between plasmolysis and deplasmolysis:**

(FSD. GI. SGD. GII. 2015) (LHR. GII. RWP. GI. 2016) (LHR. GI. 2017) (MLN. GI. 2018)

Ans.

Plasmolysis	Deplasmolysis
i. The shrinkage of protoplast due to exosmosis of water is called plasmolysis.	i. Deplasmolysis is the reverse of plasmolysis process.
ii. When a living cell is placed in a solution having lower water potential than that of the cell, plasmolysis takes place and the cell is called plasmalysed cell.	ii. When a plasmolysed cell is placed in distilled water which has highest water potential, the water molecules would move from distilled water into the cell and the cell is now called deplasmolysed cell.

10. **Define Guttation? What factors affect it?**

Ans. Guttation: "The formation of water droplets on pores at the edge of a leaf is called guttation". It is also known as exudation. It can also be defined as: "Guttation is loss of liquid water through water secreting glands or hydathodes"

Factors affecting Guttation: Guttation is a phenomenon closely associated with root pressure. Guttation is more notable when transpiration is suppressed and the relative humidity is high at night.

So, this type guttation occurs due to positive root pressure developed in xylem tissue of roots.

11. **Define Imbibition. Who worked on it?**

(GRW. GII. 2014) (SDG. GI. 2016) (LHR. GI. 2018) (GRW. 2019)

Ans. Imbibition: "Imbibition is a process in which water enters soil and binds to clay and humus particles then root cell walls imbibe water from the soil and this water moves by apoplast pathway".

12. **What factors are responsible for bleeding in plants?**

(GRW. GI. 2014)

Ans. Factors responsible for bleeding in plants:

Followings are two main factors responsible for bleeding:

i. The hydrostatic pressure in xylem and phloem elements.

ii. The roots pressure which is exerted by the xylem tissues of roots.

13. Write a note on electrocardiogram. (LHR. GII, 2017)

Ans. Electrocardiogram: It is an electrographic interpretation of the electrical flow of impulses in the heart, and is taken by E.C.G. (electrocardiograph) machine.

As the cardiac impulses pass through the heart, electrical currents spread into the tissues surrounding the heart. A small proportion of these currents spread all the way on the surface of the body. If electrodes are placed on the skin on opposite sides of the heart, electrical potentials generated by these currents can be recorded. This recording is known as electrocardiogram.

14. What do you know about bleeding in plants?
(SGD. GI, 2016) (DGK. GII, MLN. GII, 2017) (LHR. GII, 2018) (DGK. 2019)

Ans. Bleeding in plants: Sometimes, it so happens that certain plants, when cut, pruned, lapped or otherwise wounded, show a flow of sap from the cut ends or surfaces quite often with a considerable force. The phenomenon is called bleeding.

15. What are Hydathodes? (BWP. GI, 2016)

Ans. Hydathodes: Guttation is the loss of liquid water through water secreting glands called Hydathodes. The dew drops that can be seen on the tips of grass leaves or strawberry leaves are actually guttation droplets exuded from hydathodes.

16. What is stroma? Give its function. (GRW. GI, 2014)

Ans. Stroma: Stroma is a fluid matrix or interior of the chloroplast in which thylakoids and grana are suspended.

It is the site where carbon is fixed and reduced resulting in the synthesis of sugar during the dark reactions of photosynthesis (reactions of Calvin cycle).

17. How guttation differs from imbibition? (BWP. GII, 2017)

Ans. Guttation or Exudation: The loss of liquid water through the water secreting glands or hydathodes in leaves is called guttation. The dew drops at tips of grass leaves or strawberry leaves are actually guttation droplets. These droplets exude from the hydathodes. Guttation is caused due to root pressure. This root pressure is developed in the xylem tissues of the root.

Imbibition: The increase of volume of components of the cell wall especially cellulose, pectin and lignin without dissolving in water is called imbibition. Sacks in 1874 suggested that the water molecules move along the cell walls of the xylem vessels by imbibition. The dry cell wall of the plant and protoplasm of the cell increases the attraction for water. So considerable imbibition forces are developed in the plant body. In this way, the root cell walls imbibe water from the soil. This water moves by apoplast pathways. Imbibition is a reversible process. When absorbed water is lost, the original volume of the cell wall is restored.

18. What are lenticels? (MLN. GI, 2015) (GRW. GII, 2016)

Ans. Lenticels: Lenticels are one of numerous pore like sites in the cork layer of bark at which gaseous exchange can take place and water is lost in the form of water vapours.

19. **What is plasmodesmata?** (GRW. GI. 2014) (DGK. GI. 201[illegible])

Ans. Plasmodesmata: Plasmodesmata are cytoplasmic strands that extend through pores in adjacent cell walls. They connect cytoplasm of neighbouring cells.

20. **What is the function of pacemaker?** (SWL. GII. 201[illegible])

Ans. Function of pacemaker: Pacemaker is responsible for initiating the impilses which trigger the heart beat rate.

22. **How are sources different from sinks in plants?** (DGK. GI. 201[illegible])

Ans.

Sources	Sinks
i. Sources include the exporting organs, typically a mature leaf or storage organ.	i. Sinks are the areas of active metabolism or storage e.g. roots, tubers, developing fruits and leaves and growing regions.
ii. At source, food is moved by active transport into the sieve tubes, their solute concentration increases and water enters them from xylem. This result in higher pressure of water in these tubes, which drives the solution of food towards sink.	ii. At the sink end, food is unloaded by active transport. Water also exist from the sieve tubes. The exit of water decreases pressure in sieve tubes which causes a mass flow from the higher pressure at the source to the now lowered pressure at the sink.

23. **How do Humidity and vapour pressure affect rate of transpiration?** (DGK. GI. 201[illegible])

Ans. Humidity and vapour pressure: When air is dry the rate of division of water molecules from the surgaces of mesophyll, cell, air spaces and through stomata to outside the leaf increases. So more water is lost, increasing the rate of transpiration. In humid air the rate of diffusion is much reduced. This decreases the rate of transpiration significantly.

24. **How Sieve tubes and companion cells communicate?** (DGK. GI. 2017)

Ans. Sieve Elements or Sieve Tube Members:

The sieve elements are characterized by sieve areas. The portions of the cell wall which interconnect the conducting cells are called sieve areas. The sieve areas are generally formed at the end walls of the sieve tube members. The individual sieve tube member cells are joined by these end walls. The sieve tube members are joined longitudinally in a series to form sieve tube. There are pores in the sieve plates. So sieve tubes are open channels and transport of material takes place between the sieve elements.

Companion Cells: One or more companion cell is associated with each sieve tube member. The sieve tubes and companion cells are communicated with each other by plasmodesmata. Companion cells provide ATP and proteins to sieve tubes. The photosynthetic products pass from the photosynthesizing cells (mesophyll and palisade cell of leaf) into the sieve tube through companion cells.

25. **Name four parts of heart of fishes.** (MLN. GI. 2016)

Ans. Parts of heart of fishes:

i. Sinus venosus ii. an atrium iii. a ventricle iv. a conus arteriosus

26. What is open circulatory system? Give an example: (BWP. GI, 2015)

Ans. Open Circulatory System: A circulatory system in which the circulating fluid is not entirely enclosed within the continuous set of inter connected vessels is called open circulatory system".

Example: Open circulatory system is observed in animals belonging to phylum arthropod, a molusca and group of protochordates, the tunicates only.

27. Write a note on single circuit heart. (MLN. GI, 2013) (AJK. GI, 2015) (LHR. GII, SWL. GI, 2016)

Ans. Single Circuit Heart: Single circuit heart is one in which the blood flows in one direction only. Single circuit heart never receives oxygenated blood. Only deoxygenated blood passes through the heart.

Example: The heart of fish functions as a single circuit heart.

28. What is the function of eosinophils? (MLN. GII, 2014)

Ans. Function of eosinophils: Eosinophils are phagocytic, and ingest foreign proteins and immune complexes rather than bacteria which:

i. Inactivate inflammation-producing substances.

ii. Release enzymes used in fighting parasites and destroying allergens.

29. Differentiate between single and double circuit heart: (GRW. GI, 2014) (LHR. GII, GRW. GII, 2015) (FBD. GI, 2017) (FBD. 2018)

Ans.

Single Circuit Heart	Double Circuit Heart
i. Single circuit heart is one in which the blood flows in one direction only. ii. Single circuit heart never receives oxygenated blood. Only deoxygenated blood passes through the heart. Example: the heart of fish functions as a single circuit heart.	i. Double circuit heart is one in which the blood flows in two directions. ii. Right side of Double circuit heart contains deoxygenated blood and left side contains oxygenated blood. Example: The heart of amphibians, reptiles, aves and mammals functions as a double circuit heart.

30. Define the function of basophils. (MLN. GI, 2017)

Ans. Function of basophils: Basophils produce heparin a substance that inhibits blood clotting. These also produce chemicals, such as histamine, that participate in allergi[c] reactions in response to tissue damage and microbial invasion.

31. Differentiate between pulmonary and systemic circulation: (SGD. GI, 2015) (BWP. GI, 2016) (SWL. GI, DGK. GI, 2017) (SWL. 201[illegible])

Ans.

Pulmonary Circulation	Systemic Circulation
i. Circulation of blood between heart and lungs is known as pulmonary circulation. ii. Pulmonary circulation is by pulmonary arch carrying deoxygenated blood from right ventricle of heart to lungs and the blood returns to left atrium after oxygenation via polmonary vain.	i. Circulation of blood between heart an[d] all body parts except lungs is known [as] systemic circulation. ii. In systemic circulation, systemic a[rch] distributes blood to different parts of [the] body and then the blood from the b[ody] returns to the heart, in the right atr[ium] via Precaval and post caval veins.

(SGD. GI, 2014)

32. **What are Leucocytes?**

Ans. Leucocytes: Leucocytes are white blood cells. They are colourless as they do not contain Pigments. One cubic millimeter of blood contains 7000 to 8000 them. There are at least five different types of leucocytes which can be distinguished on the basis of the shape of the nucleus and density of granules in the cytoplasm.

33. **How mineral ions are transported into root cells whose concentration is already high in root cells.** (RWP. GI, 2016)

Ans. Mineral ions are transported into root cells whose concentration is already high in root cells by active transport. In this process molecules and ions move from their lower concentration to their higher concentration through cell membrane by the use of energy in the form of ATP.

34. **Give two important chemicals produced by Basophils. What functions do they perform?** (AJK. GI, 2016)

Ans. Chemicals produced by Basophils: Following are two important chemicals produced by Basophils.

i. Heparin ii. Histamine

Function of Heparin: Heparin is a substance that inhibits blood clotting.

Function of Histamine: Histamine participate in allergic reactions and in response to tissue damage and microbial invasion.

35. **Give the location of bicuspid and tricuspid value in the human heart.** (FBD. GI, 2016)

Ans. Location of bicuspid value: Bicuspid value is located at the opening between left atrium and left ventricle.

Location of tricuspid value: Tricuspid value is located at the opening between right atrium and right ventricle.

36. **Define blue baby and its one cause.**

(LHR. GI, GRW. GII, 2014) (LHR. GI, MLN. GI, DGK. GII, 2015) (LHR. GI, GRW. GI, 2016) (LHR. GI, SWL. GI, 2017) (SWL, RWP. 2018) (GRW. 2019)

Ans. Blue Babies: Failure of interatrial foramen to close or of ductus arteriosus to fully constrict result in cyanosis of new born known as blue babies.

Cause of Blue Babies: The main cause of blue babies is mixing of blood between two atria and the mixed blood is supplied to the body of new born babies resulting in blueness of skin.

37. **What is Hypertension?**

Ans. Hypertension: (FBD. GI, 2014) (GRW. GI, 2016)

i. Hypertension is a condition of high blood pressure.

ii. Prolonged high blood pressure damages the lining of the blood vessels and also leads to weakening of heart muscles with declining efficiency of the pumping action of the heart.

iii. Blood may then be retained in the heart and lungs, often leading to fatal condition called congestive heart failure (CHF).

38. What is myocardial infarction (Heart attack)? (SGD. GL 2016) (GRW. GL 2017)

Ans. Myocardial infarction (Heart attack): Blockage of blood vessel in the heart by an embolus or by locally formed thrombus causes necrosis or damage to portion of heart muscles develops a condition known as a heart attack or technically termed as myocardial infarction.

39. What is stroke? (LHR. GL 2014) (RWP. GL 2017) (MLN. GL 2018)

Ans. Stroke: If the normal flow of blood is blocked by an embolus or a locally formed thrombus in a blood vessel in the brain and causes necrosis or death of the surrounding neural tissue (owing to lack of O_2). The condition created is known as a brain stroke or cerebral infarction.

40. Differentiate between vasodilation and vasoconstriction. (RWP. GL 2015)

Ans.

Vasodilation	Vasoconstriction
It is expansion of diameter of blood vessels. It occurs due to relaxation of smooth muscle layer of the arterioles. It decreases resistance and increases blood flow to an organ.	It is narrowing of the diameter of blood vessels. It occurs due to contraction of smooth muscle layer of the arterioles. It increases resistance and decreases blood flow to an organ.

41. What is brain hemorrhage? Give its two preventive measures: (SGD. GII. RWP. GL 2015) (DGK. GII. 2016) (RWP. GL 2017)

Ans. Brain Hemorrhage: Brain Hemorrhage is the discharge of blood from bursting of any of the arteries supplying the brain. When the wall of the arteries becomes hard and loses elasticity and higher blood pressures would result brain hemorrhage.

Preventive Measures of Hemorrhage:

i. Maintenance of normal blood pressure.
ii. Taking in of less cholesterol in food.
iii. Do not become over weight.
iv. Do not smoke.
v. Do regular exercise.
vi. Avoid stress and tension

42. Define Blood Pressure. (MLN. GL 2018)

Ans. Blood Pressure:

i. Blood pressure is the measure of force with which blood pushes up against the walls of blood vessels.
ii. It is the force that keeps blood flowing from the heart to all the capillary networks in the body.
iii. This pressure is generated by the contraction of ventricles and is the highest in aorta, then gradually reduces in arteries.
iv. The pressure reaches its high point during systole and its low point during diastole.
v. Systolic pressure in normal individual is 120 mm Hg while diastolic pressure in normal individual ranges between 75-85 mm Hg.

43. How systolic pressure differ from diastolic pressure? (DGD. GI, 20..)

Ans.

Systolic pressure	Diastolic Pressure
i. Systolic pressure is generated by the contraction of ventricles and is the highest in the aorta, then gradually reduces in arteries.	i. During diastole, the relaxation phase of the cardiac cycle, the heart is not exerting pressure on the blood in the arteries and pressure in them falls. It is diastolic pressure.
ii. Systolic pressure which in normal individuals is 120 mm Hg.	ii. Diastolic pressure which in normal individuals ranges between 75-78 mm Hg.

44. What is active immunity? (DGD. GI, 20..)

Ans. Active Immunity: The use of vaccines and making a person immune against the disease or infection is called active immunity.

45. What is atherosclerosis? How is it caused? (DGK. GII, 20..)

Ans. Atherosclerosis: It is coexisting atheroma and arteriosclerosis. Atheroma i.e., deposition of hard yellow plaque of lipoid material in the inner most layer of the arteries, may be due to high level of cholesterol in the blood.

Arteriosclerosis is degenerative arterial change associated with advancing age, primarily thickening of middle layer of arteries and usually associated with some degree of atheroma.

46. What are lymph nodes? What is their function? (SWL. GI, 2014) (BWP. 20..)

Ans. Lymph Nodes: Lymph nodes are masses of connective tissue that contain lymphocytes and through which lymph is filtered.

Lymph nodes are present in the neck region, axilla and groin of humans.

Function of Lymph Nodes: The main function of lymph nodes is to filter the lymph because lymph nodes contain lymphocytes which help to provide immunity against the disease.

47. Define immunity and give two types.
(DGK. GI, 2015) (SWL. GI, DGK. GI, BWP. GI, 2016) (FBD. GI & GII, 20..)

Ans. Immunity: (Definition) The capacity to recognize the intrusion of any material foreign to the body and to mobilize cell and cell products to help remove the particular sort of foreign material with greater speed and effectiveness is called immunity.

Types of immunity:

i. Active immunity.
ii. Passive immunity.

48. How sieve cells and companion communicate? (DGK. GI, 20..)

Ans. Sieve cells and companion communicate through plasmodesmata.

49. Define Antigen and Antibody. (GRW. GI, 2017) (AJK. 20..)

Ans. Antibodies: The antibodies are special types of proteins called immunoglobulin. The vertebrates produce antibodies in response to antigens. The antibodies are specific. They destroy the only antigen which has stimulated the formation of those antibodies. Antibodies are synthesized in B-lymphocytes. Then these are secreted into the lymph and blood. Antibodies circulate freely in the lymph or blood.

Antigen: The antigen or immunogen is a foreign substance (often proteins) which stimulates the synthesis of antibody formation. The antibodies immobilize the antigen and ultimately causes the destruction of the antigen.

50. Differentiate between natural active immunity and artificial active immunity. (GRW. GI. 2015)

Ans.

Natural Active Immunity	Artificial Active Immunity
When a person is exposed to an infection (antigen), becomes ill and in most cases survives then this immunity developed against that disease is called naturally active immunity	When a person is vaccinated, the productions of antibodies are stimulated in the body making the person immune against a particular disease or infection. This immunity has been achieved by artificially introducing antigen in the body, so it is called artificial active immunity.

51. Define antiserum. (BWP. GI. 2016)

Ans. Antiserum: Antiserum is a serum containing antibodies. Antiserum is used to develop passive immunity in which response is immediate but not long lasting.

52. What is Passive Immunity? (MLN. GI. 2016) (MLN. GI. 2019)

Ans. Passive Immunity: In passive immunity, antibodies are injected in the form of antisera, to make a person immune against a disease. Passive immunity response is immediate, but not long lasting because no time is taken for the production of sufficient level of antibodies and after the level of antibodies is reduced or they are used up no more antibodies production is there. The method of passive immunization is used to combat active infections of tetanus, infectious hepatitis, rabies, snake bite venom etc. Passive immunity is the immunity to disease provided indirectly, as in the transfer of antibodies from mother of fetus across the placenta.

53. Define Active and Passive immunity. (MLN. GI. 2016)

Ans. Active Immunity: The use of vaccines or antigens, which stimulates the production of antibodies in the body and makes the person immune against the disease or infections, is called active immunity. It may be artificially or naturally induced. Its effect is not immediate. Its effect is long lasting.

Passive Immunity: The injection of antibodies in the form of antisera for making a person immune against a disease is called passive immunity. It is always artificially induced. Its effect is immediate. Its effect is not long lasting.

54. What is cell-mediated and humoral immune response? (SGD. GI. 2014) (LHR. GI. 2017) (LHR. GII, DGK. GII. 2018)

Ans. Cell-mediated Response: The first system of immunity consists of T-lymphocytes. T-Cells recognize antigen then combat micro-organisms and /or affect the rejection of foreign tissues (in case of tissue transplant). This is called cell mediated response.

Humoral Immune Response: The other system of immunity consists of B- lymphocytes. B-cells recognize antigen and form plasma cell clone. These plasma cell synthesize and liberate antibodies into the blood plasma and tissue fluid. Here antibodies attach to the surfaces of bacteria and speed up their phagocytosis or combine with them neutralize toxins produced by micro-organisms, by producing antitoxins. This is called humoral immune response.

55. What are blood platelets? Give their main function. (GRW. 2018) (SGD. 2019)

Ans. Blood Platelets: Blood platelets are not cells. These are fragments of large cells called megakaryocytes, about 2-3 nm in diameter.

Function of Platelets: Their important function is blood clotting. In this process they cause conversion of fibrinogen, a solid plasma protein, into insoluble form, fibrin. The fibrin thread enmesh red blood cells and other platelets in the area of damaged tissue, ultimately forming a blood clot. The clot serves as a temporary seal to prevent bleeding until the damaged tissue can be repaired.

56. Where the human's heart is located in the body? Give names of layers that surround the heart. (GRW. 2018)

Ans. Location of Human's Heart: The human heart is a pumping organ. It is located in the chest cavity between two lungs.

Layers Surrounding the Heart: The wall of the heart is composed of three layers.

i. Endocardium ——— outermost layer
ii. Myocardium ——— middle layer
iii. Epicardium ——— innermost layer

57. Differentiate between B and T lymphocytes. (FBD. 2018)

Ans.

B-Lymphocytes	T-Lymphocytes
B-lymphocytes has been named due to their relationship with Bursa of Fabricius. The Bursa of Fabricius is lymphoid structure present in the wall of cloaca of young birds from where B-lymphocytes were discovered to have role in immune system.	T-lymphocytes has been named due to their relationship with Thymus gland. The influence of the thymus gland is essential in making T-cells immunologically competent.

58. Define Cohesion Tension Theory. (MLN. GI. 2018)

Ans. Cohesion Tension Theory: Cohesion Tension Theory is a theory of intermolecular attraction that explains the process of water flow upwards (against the force of gravity) through the xylem of plants.

This theory was proposed by Dixon in 1894. It depend on the following.

i. Cohension: It is the force of attraction among water molecules. The cohension holds water together, forming a solid chain like column within the xylem tubes. The water molecules form hydrogen bonds between the molecules.

ii. Tension: Tension is the force between the molecules of water held by hydrogen bonds. It is provided when this water chain is pulled up the xylem. This xylem water tension is strong enough to pull water up 200 meters (more than 600 feet) in plants.

59. Differentiate between Thrombus and Embolus. (LHR. GII, BWP. GI. 2017)-(MLN. GII. 2018)

Ans.

Thrombus	Embolus
Thrombus is a solid mass or plug of blood constituents in a blood vessel. This mass may block (wholly or only in part) the vessels in which it forms.	The thrombous may be dislodged or carried to some other location (rather in blood vessel) in the circulatory system, in which case it is called an embolus.

60. Differentiate between open and closed circulatory system. (SWL. 2018)

Ans.

Open Circulatory System	Closed Circulatory System
In open circulatory system:	In closed circulatory system:
i. The blood does not remain enclosed in the blood vessels and comes in direct contact with other body cells, and bathes them.	i. Blood always remain in the blood vessels, and does not come in direct contact with other cells of the body.
ii. There are no typical arteries, veins and capillaries.	ii. Inter-connected systems of arteries, veins and capillaries are present.
iii. Exchange of nutrients and waste products between the blood and tissue occurs when blood directly bathes the tissue.	iii. Exchange of nutrients and waste products between the blood and tissue via tissue fluid occurs through capillaries.

01. How stomata open? Give one method? (SGD. 2018)

Ans. Opening of Stomata: As a result of photosynthesis sugars are produced in the guard cells during day time when light is available. When sugar level rises i.e., solute concentration increases or water potential decreases and the guard cells become turgid, and they separate from one another, and stoma or pore opens.

02. Define ECG. (SGD. 2018)

Ans. ECG: ECG stands for electrocardiograph. It is an electrographic interpretation of the electrical flow of impulses in the heart, and is taken by E.C.G. machine.

03. What is meant by systemic circulation? (BWP. 2018) (LHR. GI, FBD. GII, 2019)

Ans. Systemic Circulation: The systemic arch distributes blood to different parts of the body, and then the blood from the body returns to the heart, in the right atrium via precaval and postcaval. This is systemic circulation.

04. Differentiate between Active transport and Diffusion. (DGK. GI, 2019)

Ans.

Active Transport	Diffusion
The movement of materials against the concentration gradient i.e., area of low concentration to area of high concentration with the use of energy is called active transport. The energy used is provided by ATP.	Soluble materials (solutes) are in constant motion and moves from an area of higher concentration to an area of lower concentration across the membrane by a process called diffusion.

05. What are sinks? (AJK. 2019)

Ans. Sinks: Sinks are the areas of active metabolism or shortage e.g. roots, tubers, developing fruits and immature leaves and even the growing tips of stem and root. The movement in phloem is from sources to sinks in most of the plants during active photosynthesis. But when the leaves fall off during autumn, the movement in phloem is from sinks to sources i.e., growing tips of shoots of the plants.

06. What are parabronchi? (LHR. GI, 2019)

Ans. In the lungs of birds instead of alveoli tiny thin walled ducts are present called parabronchi.

07. What is respiratory distress syndrome? (LHR. GI, 2019)

Ans. Respiratory Distress Syndrome: Respiratory distress syndrome is common in premature infant, especially for infant with a gestation age of less than 07 months. This occurs because enough surfactant is not produced to reduce the tendency of the lungs to collapse.

08. Define plasmolysis and deplasmolysis. (FBD. GI, 2019)

Ans. Plasmolysis: Plasmolysis can be defined as the shrinkage of protoplast due to exosmosis of water. When a living cell is placed in a solution having lower water potential then that of the cell, plasmolysis takes place and the cell is called plasmolysed.

Deplasmolysis: If plasmolysed cell is placed in distilled water (which has highest water potential) the water molecules would move from distilled water through differentially permeable cell membrane into the cell, and the cell would become deplasmolysed.

69. **Write role of lymphatic system in defense of body.** (MLN. GI. 2019)

Ans. **Role of Lymphatic system:** The lymphatic system helps defend the body against foreign invaders. Lymph nodes have lymphocytes and macrophages that destroy bacteria and viruses. (SGD. 2019)

70. **How heart sound is produced.**

Ans. When the ventricles receive blood from atria, both ventricles contract and the blood is pumped to pulmonary arteries and aorta. The tricuspid and bicuspid valves close and 'lubb' sound is made. Ventricular systole ends and ventricle relax at the same time semilunar valves at the base of pulmonary artery and aorta close simultaneously and 'dubb' sound is made. (Lubb, dub can be heard with the help of a stethoscope).

ESSAY TYPE QUESTIONS

Q1. Soil water moves and reaches to xylem tissues by various pathways. Explain. (SGD. GI. 2017)

Q2. Define Root pressure. Explain its role in ascent of sap. (MLN. GI. 2015) (AJK. 2016)

Q3. Describe the two hypotheses to explain the opening and closing of stomata. (SGD. GI. 2017) (DGK. GI. FBD. GI. 2016)

Q4. Describe various functions of blood. (SWL. GI. 2014) (BWP. GI. 2015) (SWL. GI. 2016) (LHR. GII. 2017) (LHR. GI. BWP. 2018)

Q5. Describe the composition of blood plasma. (MLN. GI. 2016) (BWP. GI. 2017) (FBD. GII. 2018)

Q6. Write a note on white blood cells. (SGD. GII. 2018)

Q7. Give an account of blood plasma. (BWP. GI. LHR. GII. 2019)

Q8. Compare the structure and functions of artery and vein. (GRW. GI. 2015)

Q9. Write down any four differences between arteries and veins. (GRW. GI. 2017) (BWP. 2019)

Q10. What is myocardial infarction? Explain. (DGK. GI. 2015) (LHR. GI. 2016)

Q11. Give functions of lymphatic system. (LHR. GI. 2015) (DGK. GI. FBD. GI. 2017) (LHR. GI. 2019)

Q12. Describe lymphatic system. (AJK. GI. 2015) (GRW. GII. 2016)

Q13. Define immunity. Give its types. (FBD. GI. 2014) (FBD. GI. 2015) (DGK. GII. 2016) (LHR. GI. BWP. 2018) (SGD. 2019)

Q14. How CO_2 concentration and humidity affect the rate of transpiration? (LHR. GII. 2019)

Q15. What is cardiac cycle? Describe its phases. (GRW. 2018) (FBD. GI. SWL. 2019)

Q16. Explain the structure of heart of man. (FBD. 2019)

Q17. Compare closed and open circulatory system. (MLN. GII. 2018)

ACCORDING TO THE
ACCELERATED LEARNING PROGRAMME (ALP)
OF EDUCATION DEPARTMENT

Smart Syllabus

ANNUAL PAPERS

TAKEN FROM PREVIOUS QUESTIONS
OF ANNUAL PAPERS 2014 - 2019
OF ALL SECONDARY BOARDS

LAHORE
GUJRANWALA
FAISALABAD
MULTAN
SAHIWAL
RAWALPINDI
SARGODHA
BAHAWALPUR
D.G. KHAN
AZAD JAMMU & KASHMIR

Paper No.01

BIOLOGY

Annual Paper 2014-2019

Roll No. ______________________ (To be filled in by the candidate)

Maximum Marks: 17 **(OBJECTIVE TYPE)** Time Allowed : 20 Minutes

NOTE: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q1. 17

1. **The study of microorganism includes bacteria, virus, protozoan and microscopic algae and fungi is:** (AJK, GII, 2019)
   (A) Microbiology (B) Parasitology
   (C) Molecular biology (D) Biotechnology
2. **The specific heat of vaporization of water is:** (GRW, GI, 2019) (LHR, GI, 2017) (RWP, 2019)
   (A) 457 kcal/kg (B) 574 kcal/kg
   (C) 547 kcal/kg (D) 475 kcal/kg
3. **If non-protein part is loosely attached to protein, it is known as:** (LHR, GI, 2014) (GRW, GII, 2015) (RWP, GI, 2017)
   (A) Cofactor (B) Coenzyme
   (C) Holoenzyme (D) Active site
4. **Organelle of symbiotic origin is:** (DGK, GII, 2016) (LHR, GII, 2017) (FSD, GI, RWP, 2019)
   (A) Cell wall (B) Cell membrane
   (C) Mitochondria (D) Vacuole
5. **Small pox is caused by Pox Virus which is:** (SWL, GI, 2016) (LHR, GII, 2017)
   (A) DNA Naked Virus (B) RNA Naked Virus
   (C) DNA Enveloped Virus (D) Complex Virus
6. **Some bacteria breakdown the proteins of dead plants and animals and release:** (AJK, GII, 2014)
   (A) Sulophates (B) Phosphates
   (C) Nitrates (D) Carbonates
7. **Which are the major producers in aquatic ecosystem?** (LHR, 2014)
   (A) Green algae (B) Diatoms
   (C) Euglenoids (D) Red algae

(FBD. GII, 2014) (MLN. GI, 201[illegible])

8. Ustilago species is most common:

(A) Rust Fungi (B) Smut fungi
(C) Yeast (D) Mold

(LHR. GI, 2014) (RWP. GI, 201[illegible])

9. Which one of the following is not extinct?

(A) Horneophyton (B) Psilotum
(C) Psilophyton (D) Cooksonia

(LHR. GI, MLN. GI, 201[illegible])

10. The body cavity of Nematoda is:

(A) Blastocoel (B) Pseudocoelom
(C) Haemocoelom (D) Coelom

(GRW. GI, 201[illegible])

11. Animals that have their body cavity filled with parenchyma are:

(A) Acoelomates (B) Coelomates
(C) Pseudocoelomates (D) Mesoderms

12. The break down of terminal phosphate of ATP releases energy about:

(LHR. GI, SWL. GI, 2014) (RWP. RWP. 201[illegible])

(A) 7.0 k cals (B) 7.3 k cals
(C) 7.5 k cals (D) 8.1 k cals

13. The process by which pH gradient across membrane drives of formation of ATP is called:

(LHR. GI, 2014) (GRW. 201[illegible])

(A) Photosynthesis (B) Chemiosmosis
(C) Photorespiration (D) Calvin cycle

14. HCl is secreted by gastric gland's cells of stomach:

(LHR. GI, 2014) (MLN. GI, 2015) (LHR. GII, 201[illegible])

(A) Mucous cells (B) Chief cells
(C) Parietal cells (D) Zymogene cells

15. The organism that lives upon or within another organism is called:

(LHR. GII, 2014) (LHR. GI, 201[illegible])

(A) Predator (B) Pest
(C) Parasite (D) Host

16. Water is more viscous than air:

(FBD. GI, 2015) (AJK. 201[illegible])

(A) 10 Times (B) 20 Times
(C) 50 Times (D) 100 Times

17. Casparian strips are present in the cells of root:

(MLN. GI, 2014) (LHR. GI, DGK. GII, 2015) (LHR. GI, DGK. GII, 2016) (RWP. GII, 2017) (GRW. 2018) (RWP. 201[illegible])

(A) Endodermis (B) Epidermis
(C) Cortex (D) Pith

Annual Paper 2014 - 2019

Roll No. ______________________ (To be filled in by the candidate)

Maximum Marks: 68 **(SUBJECTIVE TYPE)** Time Allowed: 2.40 Hours

SECTION - I

Q2. Write short answers to any EIGHT (8) questions: 16

(i) What is Biochemistry? Give its importance. (GRW. GI, 2014)(GRW. GII, FBD. GI, 2019)

(ii) What is heat capacity of water? Give its importance. (LHR. GII, 2016) (MLN. GII, DGK. GI, 2019)

(iii) Define enzymes. (AJK. GI, 2015) (LHR. GII, 2016)

(iv) What are cofactor and activator of enzyme? (FBD. GI, DGK. GI, 2015) (LHR. GII, MLN. GI, SWL. GI, 2016) (FBD. GI, BWP. GI, SWL. GI, 2017) (DGK. 2019)

(v) How does an enzyme accelerate a metabolic reaction? (LHR. GI, 2014)

(vi) What is nuclear mitosis? (LHR. GI, SWL. GI, MLN. GI, 2014) (LHR. GII, 2016) (DGK. GII, 2017) (GRW. FBD. GII, MLN. GII, AJK. 2019)

(vii) Define hyphae. Give their two types. (SWL. GI, 2014) (LHR. GII, 2015) (GRW. GII, 2016) (LHR. GII, 2017)

(viii) Why Annelids and Arthropods are considered having same origin? (BWP. GI, 2015) (LHR. GI, FBD. GI, 2016)

(ix) Differentiate between schizocoelous and enterocoelous coelom. (BWP. GI, 2014) (BWP. GII, 2015) (LHR. GII, 2019)

(x) What are diploblastic animals? (AJK. GI, 2015) (FBD. 2019)

(xi) Define bioenergetics. (LHR. GI, 2014) (FBD. GI, DGK. GI, 2015) (SGD. GI & GII, 2016) (SWL. GI, 2017) (SGD. 2018)

(xii) What are aerobic and anaerobic respiration? (BWP. GI, 2016) (GRW. GI, 2017)

Q3. Write short answers to any EIGHT (8) questions: 16

(i) What are bio-elements? Give their proportion in human body. (BWP. GI, 2014) (GRW. 2018)

(ii) Write the names of four eras of geological time chart. (SWL. GI, 2014) (LHR. GII, 2016) (MLN. GII, DGK. GI, 2017) (SWL. 2019)

(iii) What is plasma membrane? Give its composition. (BWP. GI, 2015) (DGK. GI, 2019)

(iv) Define fluid mosaic model of the cell membrane. (LHR. GI, 2014) (GRW. GI, 2016) (LHR. GII, DGK. GI, 2017)

(v) Write two distinguishing characters of kingdom protista. (LHR. GII, DGK. GI, 2016) (DGK. GII, 2017)

(vi) Write a note on plasmodium causing disease. (DGK. GII, 2016)

(vii) Write down two similarities and differences between fungi and fungus like protists. (LHR. GI, GRW. GI, 2014) (BWP. GI, 2015) (AJK. GI, 2016) (DGK. GII, SWL. GI, 2017) (MLN. GI, SWL. 2018)

(viii) What is phylogenetic system of classification? (MLN. GI, 2014) (AJK. GI, SWL. GI, 2016) (GRW. 2019)

(ix) Differentiate between ovule and seed. (LHR. GII, 2014) (GRW. GI, 2016)

(BWP. GI, 2014) (LHR. GI, [illegible])

(x) Give the role of plasmids.

(xi) Differentiate between apoplast and symplast pathway. [illegible]

(GRW. GI, BWP. GI, 2014) [illegible]

(xii) Define Inhibition. Who worked on it? (GRW. GII, 2014) [illegible]

Q4. Write short answers to any SIX (6) questions:

(i) Define species. Give one example. (SWL. GI, BWP. GI, 2014) [illegible]

(SGD. GII, 2015) [illegible]

(ii) Viruses are intracellular obligate parasites. Comment. (LHR. GII, 2017) (MLN. GI, [illegible])

(iii) Differentiate between lophotrichous and amphitrichous. (BWP. GI, 2015) (LHR. GII, FBD. GI, [illegible])

(iv) What are pili? Give their functions. (LHR. GII, 2014) (LHR. GII, [illegible])

(v) How Sundew (Drosera) show its insectivorous activity. (LHR. GI, [illegible])

(vi) What is Holozoic Nutrition?

(vii) In what way air is a better respiratory medium than water?

(GRW. GI, SWL. GI, 2014) (GRW. GI & GII, DGK. GII, 2015)

(GRW. GI, MLN. GI, BWP. GI, 2016) (LHR. GII, GRW. GI, SWL. GI, 2017) (DGK. 2018)

(viii) What is importance of rubisco?

(FBD. GI, 2014) (FBD. GI, RWP. GI, LHR. GII, 2015) (BWP. GI, 2017) (DGK, AJK, 2018)

(ix) What are parabronchi? (LHR. GI & GII, 2014) (LHR. GI, SGD. GII, DGK. GI, 2015)

(FBD. GI, AJK. GI, 2016) (DGK. GI, 2017) (GRW, AJK, 2018) (FBD. GI & GII, AJK. 2019)

SECTION - II

Note: Attempt any THREE questions. 3 × 8 = 24

Q5. (a) Differentiate between deductive and inductive reasoning with examples. 4

(LHR. GI, FBD. GI, MLN. GI, BWP. GI, 2014) (DGK. GI, 2015)

(b) Describe the two hypotheses to explain the opening and closing of stomata. 4

(SGD. GI, 2015) (FBD. GI, DGK. GI, 2016)

Q6. (a) Discuss water as medium of life. Also give its importance. 4

(LHR. GI, 2014) (LHR. GII, SWL. GI, DGK. GI, 2015) (SGD. GI, 2016) (BWP. GI, 2017)

(b) Discuss taxonomic status of fungi. 4

(GRW. GI, BWP. GI, 2014) (LHR. GI, GRW. GII, 2015) (AJK. 2018)

Q7. (a) Describe different classes of bacteria on the basis of flagella. 4

(GRW. GI, 2014) (GRW. GII, 2015) (GRW, DGK. GII, 2016)

(b) Write a note on adaptation of Bryophytes for life on land. 4

(AJK. GI, 2015) (LHR. GI, FBD. GI, 2016) (RWP. GII, 2017) (MLN. GI, SGD. 2018)

Q8. (a) Discuss the five Kingdom system of classification proposed by Robert Whittaker. 4

(GRW. GI, SGD. GII, 2016) (FBD. GI, 2017) (AJK. 2018) (SWL. 2019)

(b) Draw and describe Calvin cycle in photosynthesis. 4

(SDG. GI, BWP. GI, 2014) (LHR. GII, 2015) (BWP. GI, 2016) (LHR. GI, 2017)

Q9. (a) Write a detailed note on Endoplasmic Reticulum. 4

(FBD. GI, 2014) (DGK. GII, LHR. GII, 2015) (SGD. GI, 2016)

(b) Discuss the process of nutrition in insectivorous plants. 4

(DGK. GI, 2016) (LHR. GII, RWP. GI, BWP. GI, 2017) (AJK. 2018)

Paper No.02 — BIOLOGY — Annual Paper 2014-2019

Roll No. ____________________ (To be filled in by the candidate)

Maximum Marks: 17 **(OBJECTIVE TYPE)** Time Allowed : 20 Minutes

NOTE: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q1. 17

1. **A large regional community primarily determined by climate is called as:**
(MLN. GI. 2014) (LHR. GII. 2015) (LHR. GI. SGD. GI. 2016) (MLN. GII. 2018) (GRW. 2019)
   - (A) Biome
   - (B) Biosphere
   - (C) Population
   - (D) Community

2. **Most of cellular secretions are in nature:** (SGD. GI. 2016) (MLN. GI. 2018)
   - (A) Proteins
   - (B) Lipids
   - (C) Carbohydrates
   - (D) Glycoproteins

3. **Enzymes involved in respiration, are found in:** (MLN. GI. 2014) (MLN. GI. 2016)
   - (A) Chloroplasts
   - (B) Ribosome
   - (C) Mitochondria
   - (D) Nucleus.

4. **The soluble part of cytoplasm is called:** (BWP. GII. 2017) (GRW. 2019)
   - (A) Cisternae
   - (B) Gel
   - (C) Polysome
   - (D) Cytosol

5. **AIDS is caused by:** (GRW. GI. 2014) (LHR. GI. 2019)
   - (A) Fungi
   - (B) Bacteria
   - (C) Virus
   - (D) Lichen

6. **If tuft of flagella is present only at one pole of bacteria then these are called as:**
(FBD. GI. SGD. GI. 2014) (LHR. GI. 2016) (MLN. GI. 2017)
   - (A) Monotrichous
   - (B) Peritrichous
   - (C) Amphitrichous
   - (D) Lophotrichous

7. **Trypanosoma is an example of:** (GRW. GI. 2014) (MLN. GI. 2017) (LHR. GII. 2019)
   - (A) Actinopods
   - (B) Zooflagellates
   - (C) Apicomplexans
   - (D) Ciliates

8. **The group of fungi in which sexual reproduction has not been observed:** (GRW. GI, 2015) (SGD. GI, 2014) (LHR. 2015)

(A) Deuteromycota (B) Zygomycota
(C) Ascomycota (D) Basidiomycota

9. **Fern Prothallus is:** (GRW. GI, 2014) (RWP. 2016)

(A) sporophyte (B) Saprophyte
(C) Gametophyte (D) Seed

10. **Animals of which phylum have developed bilateral symmetry in their larvae and radial symmetry in adults:** (RWP. GI, 2015)

(A) Nematoda (B) Annelida
(C) Mollusca (D) Echinodermata

11. **A free swimming trochophore larva is produced during life cycle of:** (LHR. GI, RWP. GI, 2014) (RWP. GI, 2017)

(A) Coelenterata (B) Porifera
(C) Annelida (D) Arthropoda

12. **The moment in plants when carbon dioxide released by respiration equal the quantity required by photosynthesis is termed as:** (SWL. GI, 2017)

(A) Compensation point (B) Homeostasis
(C) Chemiosmosis (D) Action spectrum

13. **The area of Leaf surface covered by stomata is only:** (SGD. GI, 2016)

(A) 2 – 4% (B) 2 – 3%
(C) 1 – 2% (D) 1 – 3%

14. **In plants stunted growth of roots is due to deficiency of:** (GRW. GI, 2017)

(A) Potassium (B) Phosphorous
(C) Magnesium (D) Nitrogen

15. **The first part of small intestine is called:** (RWP. GI, 2015)

(A) Rectum (B) Ileum
(C) Jejunum (D) Duodenum

16. **Respiratory activity which occurs in plants during day time is called:** (LHR. GI, 2016)

(A) Respiration (B) Transpiration
(C) Photorespiration (D) Cutaneous respiration

17. **The volume of dry seed may increase up to 200 times after absorbing water by:** (LHR. GI, 2014) (RWP. GI, 2015) (RWP. 2017)

(A) Diffusion (B) Imbibition
(C) Osmosis (D) Active transport

Annual Paper 2014 - 2019

Roll No. ______________________ (To be filled in by the candidate)

Maximum Marks: 68 **(SUBJECTIVE TYPE)** Time Allowed: 2.40 Hours

SECTION - I

Q2. Write short answers to any EIGHT (8) questions: 16

(i) What are lipids? Give two functions of waxes. (MLN. GI, 2014) (DGK. GII, 2015) (AJK. 2016)

(ii) How many chains of amino acids are present in hemoglobin, also mention number of amino acids in hemoglobin. (MLN. GI, 2019)

(iii) What is active site of an enzyme? How it works? (RWP. GI, DGK. GI, 2015) (SGD. GI, SWL. GI, 2016) (MLN. GI, 2019)

(iv) Define Koshland model of enzyme action. (FBD. GI, SWL. GI, SGD. GI, 2014) (LHR. GII, SGD. GI, RWP. GI, 2015) (LHR. GI, GRW. GII, DGK. GII, MLN. GI, AJK. GI, 2016) (LHR. GII, FBD. GI, DGK. GII, 2017)

(v) What are enzyme inhibitors? Give their major types. (LHR. GI, GRW. GII, FBD. GI, SGD. GI, 2014) (LHR. GI & GII, GRW. GII, RWP. GI, 2015) (LHR. GI, 2016) (DGK. GI, 2017) (AJK, SGD. 2018) (FBD. GI, 2019)

(vi) What are lichens? (GRW. GI & GII, RWP. GI, AJK. GI, 2015) (LHR. GII, RWP. GI, DGK. GI & GII, RWP. GI, 2016) (MLN. GI & GII, 2017) (SGD. 2018) (MLN. GI, 2019)

(vii) Compare ascus with a basidium. (MLN. GI, 2015) (LHR. GII, 2016)

(viii) Write down the importance of sponges. (GRW. GI, RWP. GI, 2014) (GRW. GI, & GII, 2015) (LHR. GI, RWP. GI, DGK. GII, 2016) (GRW. GI, 2017) (SGD. 2018) (FBD. GI, 2019)

(ix) What are coral reefs? (SWL. GI, FBD. GI, 2014) (DGK. GII, 2015) (LHR. GI, 2016) (RWP. GI, 2017)

(x) Give beneficial effects of insects. (GRW. GI, 2014) (DGK. GII, GRW. GII, AJK. GI, 2015) (RWP. GII, 2017) (GRW, 2019)

(xi) Write down the molecular formula for chlorophyll "a" and "b". (MLN. GI, 2014) (FBD. GI, DGK. GI, & GII, 2015) (FBD. GI, 2016) (DGK. GII, 2018) (LHR. GI, 2019)

(xii) Why photosynthesis is called Redox Process? Illustrate with equation. (RWP. GII, 2014)

Q3. Write short answers to any EIGHT (8) questions: 16

(i) Define biodiversity. Give the percentage of different groups of organisms. (LHR. GII, RWP. GI, 2014) (RWP. GI, 2017) (RWP. 2019)

(ii) Define population, describe its attributes. (FBD. GI, 2015) (RWP. GI, AJK. GI, 2016) (FBD. GI, 2017)

(iii) Why is mitochondrion called self replicating organelle? (DGK. GI, SWL. GI, 2016)

(iv) How cell wall of plants differ from prokaryotes? (MLN. GII, 2017)

(v) What are choanoflagellates? (MLN. GI, SWL. GI, 2014) (LHR. GII, 2015) (FBD. GI, SWL. GI, 2016) (LHR. GI, MLN. GI, 2017) (MLN. GI, RWP. 2018) (RWP. 2019)

(vi) Differentiate between micronucleus and macronucleus in ciliates. (SGD. GI, 2014) (GRW. GI, RWP. GI, 2015) (DGK. GI, SWL. GI, 2016) (FBD. GI, 2017)

(vii) Basically the kingdom protista is defined by exclusion. How? (MLN. GI, 2015)

(viii) What are fronds, in which group they are found? (RWP. GI, 2016) (MLN. GI & GII, LHR. GII, GRW. GI, 2017) (LHR. GI, & GII, 2018)

(ix) Define ovule and embryo sac. (SGD. GI, 2014) (DGK. GI, 2016) (LHR. GI, 2017) (BWP, 2018)

(x) What do you know about bleeding in plants? (SGD. GI, 2016) (DGK. GII, MLN. GII, 2017) (LHR. GII, 2018) (DGK. 2019)

(MLN. GI, 2015) (GRW. GII, 2016)

(xi) What are lenticels?

(xii) Write a note on single circuit heart. (MLN. GI, 2013) (AJK. GI, 2015) (LHR. GII, SWL. GI, 2016)

12

Q4. Write short answers to any SIX (6) questions:

(i) Differentiate between the capsid and capsomere. (SWL. GI, 2014) (SGD. GII, 2016) (MLN. GII, 2018)

(ii) Write four symptoms of AIDS. (GRW. GII, 2015) (MLN. GII, 2019)

(iii) What are plasmids? Give their significance. (BWP. GI, SWL. GI, 2016) (GRW, 2018)

(iv) What are mesosomes? Write their role. (GRW. GI, FBD. GI, 2014) (GRW. GI, 2015) (SGD. GI, BWP. GI, 2016) (RWP. GI, BWP. GI, 2017)

(v) Name the parts of three main divisions of the digestive system of cockroach. (MLN. GI, 2016) (MLN. GI, 2017)

(vi) Define Parabronchi and Bronchioles. (SWL. GI, 2016) (SGD. 2019)

(vii) What is larynx or voice box? (MLN. GI, 2014) (MLN. GI, 2015) (LHR. GI, 2018) (SWL. 2019)

(viii) What are bronchi and alveoli? (LHR. GII, SGD. GI, 2015) (LHR. GII, SGD. GI, 2016) (RWP. GI & GII, 2017)

(ix) What are causes and symptoms of pulmonary tuberculosis? (DGK. 2019)

SECTION - II

Note: Attempt any THREE questions. 3 × 8 = 24

Q5. (a) What is hypothesis? Discuss briefly the deductive and inductive reasonings. 4

(RWP. GII, 2017)

(b) Describe the composition of blood plasma. 4

(MLN. GI, 2014) (RWP. GI, 2017) (FBD. GII, 2019)

Q6. (a) Give importance of water in nature. 4

(DGK. GI, 2017) (MLN. GI, 2018)

(b) How asexual reproduction occurs in fungi. 4

(SGD. GI, FBD. GI, 2015) (DGK. GI, RWP. GI, 2016)

Q7. (a) Discuss the process of Nutrition in Bacteria. 4

(LHR. GII, GRW. GI, SWL. GI, BWP. GI, AJK. GI, 2015) (LHR. GI, FBD. GI, GRW. GI, SWL. GI, 2016) (RWP. GI & GII, LHR. GII, 2017) (LHR. GII, DGK. GI, AJK. 2018) (LHR. GI, 2019)

(b) Describe gametophyte stage in the life history of Adiantum. 4

(GRW. GII, 2016) (MLN. GII, 2018)

Q8. (a) Describe Life Cycle of Bacteriophages. (labelled diagrams) 4

(MLN. GI, DGK. GII, AJK. GI, 2015) (GRW. GI, SWL. GI, BWP. GI, 2016) (LHR. GI, RWP. GII, DGK. GII, 2017) (LHR. GI, & GII, FBD. GI, & GII, MLN. GI, 2019)

(b) What is Glycolysis? Sketch its various steps only. 4

(GRW. GI, & GII, 2014) (GRW. GI, & GII, MLN. GI, RWP. GI, 2015) (MLN. GI, SGD, BWP. 2018)

Q9. (a) Described the structure and functions of Chloroplast. 4

(SWL. GI, 2014) (GRW. GI, 2015) (LHR. GII, SGD. GII, 2016) (SGD. 2018)

(b) Describe digestion in oral cavity of man. 4

(GRW. GII, FBD. GI, 2014) (RWP. GI, BWP. GI, SGD. GI, 2015) (GRW. GI, 2017) (DGK. GI, 2019)

Paper No.03

BIOLOGY

Annual Paper 2014-2019

Roll No.____________________ (To be filled in by the candidate)

Maximum Marks: 17 **(OBJECTIVE TYPE)** Time Allowed : 20 Minutes

NOTE: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q1. 17

1. **The branch of Biology which deals with the study of social behavior and communal life of human being is:** (BWP. GI, 2016) (GRW. 2018)
   (A) Human biology (B) Molecular biology
   (C) Social biology (D) Environmental biology
2. **The % age of RNA in a cell is:** (MLN. GI, 2016)
   (A) 3-4% (B) 40-50%
   (C) 80% (D) 10-20%
3. **If the non-protein part of enzyme is covalently bonded, it is called:** (SGD.GII, 2015) (BWP. GI, 2016) (DGK. 2019
   (A) Co-factor (B) Activator
   (C) Co-enzyme (D) Prosthetic group
4. **Cell walls of Prokaryotic Organisms lack cellulose, instead of cellulose its strengthening material is:** (GRW. GII, BWP. GI, 2014
   (A) Silica (B) Wax
   (C) Cutin (D) Murein
5. **Solanum esculentum is the scientific name of:** (MLN. GI, 2016) (MLN. GI, 201
   (A) Potato (B) Tobacco
   (C) Onion (D) Tomato
6. **Pili are made up of special protein is called:** (LHR. GI, 2015) (FBD. GII, 201
   (A) Pillin (B) Flagellin
   (C) Tubulin (D) Myosin
7. **African sleeping sickness is transmitted by:** (DGK. GI, MLN. GII, 20
   (A) Trypanosoma (B) Mosquito
   (C) Tsetse fly (D) Plasmodium

8. **Poisonous mushrooms are called:** (LHR. GII. SGD. GI, 2015) (AJK. GI, 2017) (BWP. 2019)
(A) Truffles (B) Morels
(C) Toad Stools (D) Agaricus

9. **The simplest of all bryophytes are:** (BWP. GI, 2015) (MLN. GI, 2019)
(A) Mosses (B) Hornworts
(C) Liverworts (D) Whish ferns

10. **Which one of the following is not a sub phylum of chordata?** (SGD. GI, 2014) (SGD. GII, 2016)
(A) Urochordata (B) Hemichordata
(C) Cephalochordata (D) Vertebrata

11. **All "flatworms" belong to phylum:** (GRW. 2019)
(A) annelida (B) platyhelminthes
(C) arthropoda (D) nematoda

12. **The first action spectrum was obtained by:** (BWP. GI, 2015) (SWL. 2019)
(A) T.W. Engelmann (B) Van Neil
(C) Melvin Calvin (D) Ernst Haeckel

13. **The dark reaction for photosynthesis occurs in:**
(SWL. GI, 2014) (SGD. GI, 2016) (BWP. GI, FBD. GI, 2017) (SGD. 2018) (SGD. 2019)
(A) Cytoplasm (B) Chloroplast
(C) Stroma (D) Grana

14. **Carbohydrate digesting enzymes are called:** (SGD. GII, 2014) (LHR. GI, MLN. GI, 2019)
(A) Ligase (B) Amylase
(C) Protease (D) Lipase

15. **Which type of cells in human stomach secrete Gastrin:** (BWP. GI, 2019)
(A) Mucous Cells (B) Parietal cells
(C) Zymogen cells (D) Endocrine cells

16. **Break down of alveoli of lungs is called:** (GRW. GI & GII. 2019)
(A) Asthma (B) Emphysema
(C) Tuberculosis (D) Lungs cancer

17. **Normal pH of human blood is:**
(SWL. GI, 2014) (FBD. GI, MLN. GI SGD. GII, BWP. GI, 2015) (GRW. GI, 2016) (FBD. 2019)
(A) 4.4 (B) 5.4
(C) 6.4 (D) 7.4

Annual Paper 2014 - 2019

Roll No. ______________________ (To be filled in by the candidate)

Maximum Marks: 68 **(SUBJECTIVE TYPE)** Time Allowed: 2.40 Hours

SECTION - I

Q2. Write short answers to any EIGHT (8) questions: 16

(i) What F. Sanger concluded about insulin? (LHR. GII. 2017)

(ii) Define heat of vaporization. What is heat of vaporization of water? (BWP. GII. 2015) (LHR. GI. 2018)

(iii) What are competitive and non-competitive enzyme inhibitors? (SGD. GI, BWP. GI, DGK. GII, FBD. GI. 2015) (BWP. GI, MLN. GI, DGK. GII. 2016) (BWP. GII, LHR. GI, MLN. GI, BWP. GI, SWL. GI. 2017) (GRW. BWP. 2018) (BWP. 2019)

(iv) What is induced fit model of enzyme action, who proposed it? (GRW. AJK. 2019)

(v) What is an apoenzyme? (SGD. 2018) (FBD. GII. 2019)

(vi) Why are toadstool called death angel? (MLN. GII. 2017)

(vii) What do you mean by budding and parasexuality? (BWP. GI. 2014) (LHR. GII, MLN. GI, AJK. GI. 2015) (GRW. GI. 2016) (DGK. GI. 2017) (LHR. GI, FBD. BWP. 2018) (GRW. SWL. 2019)

(viii) What are harms caused by insects? (LHR. GII. 2016) (GRW. GI. 2017) (BWP. 2018) (MLN. GI. 2019)

(ix) Give three basic characteristics of chordates. (GRW. GI. 2014) (FBD. GI, MLN. GI. 2015)

(x) What are nematocysts? Give their function. (GRW. GII. 2016)

(xi) Differentiate between photosystem I and photosystem II. (FBD. GI. 2014) (AJK. GI. 2015)

(xii) Define Chemiosmosis. (MLN. GII, GRW. GI. 2017) (DGK. GI. 2018) (LHR. GI. 2019)

Q3. Write short answers to any EIGHT (8) questions: 16

(i) Define the term biome with example. (LHR. GII. 2014) (SGD. GI. 2015) (GRW. GII. 2016)

(ii) What is deductive reasoning? Give one example. (BWP. GI. 2017) (LHR. GII. 2019)

(iii) Give Important Functions of Cytoplasm. (LHR. GI. 2015) (AJK. GI. 2016) (SGD. 2019)

(iv) Define polysome and ribosomes. (SGD. GI, AJK. GI. 2015) (BWP. GI. 2016) (MLN. GI. 2017)

(v) How algae differ from plants? (LHR. GI. 2014) (LHR. GI, RWP. GI. 2015) (BWP. GI. 2016) (MLN. GII, LHR. GII. 2017) (GRW. MLN. GI, RWP. 2019)

(vi) Write a note on Euglenoids. (DGK. GI. 2015) (SGD. GI. 2016) (GRW. GI, BWP. GI. 2017)

(vii) Write down the phylum, form, pigments and example of red algae. (BWP. GI. 2014) (LHR. GII, SGD. GI. 2015)

(viii) Differentiate between homospory and heterospory. (FBD. GI. 2016) (MLN. GII. 2018) (SWL. BWP. 2019)

(ix) Define Flower. What are essential and non-essential parts of flower? (GRW. GI. 2014) (GRW. GII. 2015) (BWP. GI. 2016) (FBD. MLN. GI, SWL. 2018)

(x) Differentiate between single and double circuit heart. (GRW. GI. 2014) (LHR. GII, GRW. GII. 2015) (FBD. GI. 2017) (FBD. 2018)

(xi) Define blue baby and its one cause. (LHR. GI, GRW. GII, 2014) (LHR. GI, MLN. GI, DGK. GII, 20..) (LHR. GI, GRW. GI, 2016) (LHR. GI, SWL. GI, 2017) (SWL, RWP. 2018) (GRW. 20..)

(xii) What is stroke? (LHR. GI, 2014) (RWP. GI, 2017) (MLN. GII, 20..)

12

Q4. Write short answers to any SIX (6) questions:

(i) Write names of four common human viral diseases. (LHR. GI & GII, 2016) (GRW. GI, 20..)

(ii) Write down symptoms and preventions of hepatitis. (GRW. GI, 2014) (GRW. GII, 20..)

(iii) Distinguish antiseptics from disinfectants. (DGK. GI, 2016) (LHR. ...)

(iv) Write a few lines on misuse of antibiotics. (GRW. GI, 2014) (GRW. GI, 2015) (LHR. GI, 2016) (MLN. GI, 20..)

(v) What are Omnivores? Give their two examples. (FBD. GI, 2016) (AJK. 20..)

(vi) Write components and functions of saliva. (MLN. GI, 2014) (SGD. GI, DGK. GI, 20..) (LHR. GI & GII, GRW. GI, FBD. GI, 2016) (MLN. GI, SWL. 20..)

(vii) How does carbon dioxide concentration affect the oxygen carrying capacity of blo.. Hemoglobin? (GRW. GI & GII, 2016) (DGK. GII, 20..)

(viii) What is asthma? Give its two causes. (LHR. GII, FBD. GI, RWP. GI, 2015) (SGD. GI, DGK. GI, 20..) (FBD. GI, LHR. GII, RWP. GII, 2017) (FBD. GI, SGD. GII, AJK. 20..)

(ix) What is the rate of breathing at rest and during exercise? (DGK. GI, 2016) (MLN. GI, 2017) (LHR. GII, 20..)

SECTION - II

Note: Attempt any THREE questions. 3 × 8 = 2..

Q5. (a) Explain the biological method for solving a biological problem.
(GRW. GI, 2017) (MLN. GII, 2018) (MLN. GI, 20..)

(b) Give functions of lymphatic system.
(LHR. GI, 2015) (DGK. GI, FBD. GI, 2017) (LHR. GI, 20..)

Q6. (a) What functions are performed by proteins in the bodies of living organisms?
(SGD. GI, 2015) (RWP. GI, 20..)

(b) Describe and draw life cycle of Rhizopus.
(DGK. GI, 2015) (SWL. GI, 2017) (GRW. SGD, 20..)

Q7. (a) Describe different physical and chemical methods to control bacteria.
(LHR. GI, MLN. GI, 2014) (DGK. GI, DGK. GI, RWP. GI, 2016) (SGD, RWP, 2018) (DGK. 20..)

(b) Give the list of various steps involved in the evolution of seed Habit?
(GRW. GI, DGK. GII, 2016) (FBD. GI, MLN. GI, 20..)

Q8. (a) Write a note on Acquired Immune Deficiency Syndrome (AIDS).
(MLN. GI, DGK. GI, 2014) (LHR. GII, RWP. GI, DGK. GI, 2015) (DGK. GII, 20..) (RWP. GI, DGK. GII, RWP. GI, 2017) (MLN. GII, DGK. GI, AJK. 2018) (MLN. GII, 20..)

(b) Explain krebs cycle. (Give only outline of kreb cycle)
(SGD. GII, DGK. GI, & GII, AJK. GI, 2015) (LHR. GII, GRW. GII, 20..) (MLN. GI, DGK. GII, DGK. GI, 2017) (LHR. GI, 2018) (MLN. GII, AJK. 20..)

Q9. (a) Differentiate between Prokaryotic and Eukaryotic cells.
(SGD. GI, 2014) (AJK. GI, 2015) (DGK. GI, 2016) (FBD. GI, MLN. GI, 2017) (DGK. 20..)

(b) Explain digestion in human stomach.
(DGK. GII, 2015) (FBD. GI, RWP. GI, DGK. GII, 2016) (GRW. 20..)

Paper No.04

BIOLOGY

Annual Paper 2014-2019

Roll No. ____________________ (To be filled in by the candidate)

Maximum Marks: 17 **(OBJECTIVE TYPE)** Time Allowed : 20 Minutes

NOTE: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q1. 17

1. **The tentative explanation of observation is called:**
(LHR. G1, BWP. G1, 2015) (SWL. G1, AJK. G1, 2016) (DGK. G1, 2016) (MLN. G1, 2017)
(A) Law (B) Theory
(C) Hypothesis (D) Deduction

2. **Most abundant carbohydrate in nature is:** (LHR. 2019)
(A) starch (B) glycogen
(C) cellulose (D) agar

3. **Lock and key model was proposed by:** (FBD. G1, 2014) (BWP. G1, 2015) (MLN. G1, 2019)
(A) Emil Fischer (B) Koshland
(C) Rudolph Virchow (D) Lorenz Oken

4. **The fluid which surrounds the thylakoids is called:**
(SWL. G1, 2016) (MLN. G1, 2017) (MLN. G1, 2019)
(A) Matrix (B) Stroma
(C) Cytoplasm (D) Nucleoplasm

5. **The common name of Allium cepa is:** (SWL. G1, 2016) (BWP. G1, 2017)
(A) Piyaz (Onion) (B) Bathu
(C) Channa (D) Potato

6. **A cube of eight cocci is termed as:** (MLN. G1, 2017) (FBD, SGD, 2018)
(A) Tetrad (B) Sarcina
(C) Diplococcus (D) Streptococcus

7. **Which one belongs to Actinopodes?** (DGK. G1, 2018)
(A) Trypanosoma (B) Plasmodium
(C) Verticella (D) Radiolarians

8. **All fungal nuclei are haploid except for transient diploid :** (LHR. GI. 2018)

(A) Spores (B) Zygote
(C) Conidia (D) Zygospores

9. **The plant of sphenopsida is also called as:** (FBD. GI. 2017) (MLN. GII. 2018)

(A) Angiosperms (B) Gymnosperms
(C) Mosses (D) Arthrophytes

10. **The phylum which is exclusively marine is:** (GRW. GI & GII. 2018)

(A) Cnidaria (B) Porifera
(C) Echinodermata (D) Annelida

11. **Which of the following is a motile coelenterate?** (GRW. 2018)

(A) hydra (B) obelia colony
(C) jelly fish (D) corals

12. **All life on planet earth is powered by:** (DGK. 2014) (DGK. 2018)

(A) Chemical energy (B) Solar energy
(C) Electrical energy (D) Atomic energy

13. **Pyruvic acid is produced as a result of:** (BWP. GI. 2015) (MLN. GI. AJK. GI. 2016) (SWL. 2018) (GRW. 2019)

(A) Krebs cycle (B) Glycolysis
(C) Phosphorylation (D) Respiratory chain

14. **The uptake of the diffusible food molecules from the digestive region across the membrane into the cell is called:** (MLN. GII. 2015)

(A) Ingestion (B) Digestion
(C) Absorption (D) Assimilation

15. **The length of Duodenum of human is about:** (BWP. GI. 2017) (GRW. 2019)

(A) 15 - 20 cm (B) 20 - 25 cm
(C) 30-35 cm (D) 10 - 15 cm

16. **The diameter of bronchiole is:** (MLN. GI. 2014) (MLN. GI. 2015)

(A) 3 mm (B) 2 mm
(C) 1 mm (D) 0.1 mm

17. **In the embryonic life red blood cells are formed in the:** (LHR. GI, MLN. GI. 2016)

(A) Bone marrow and vertebrae (B) Liver and spleen
(C) Heart and bone marrow (D) Sternum and ribs

Annual Paper 2014 - 2019

Roll No. ______________________ (To be filled in by the candidate)

Maximum Marks: 68 **(SUBJECTIVE TYPE)** Time Allowed: 2.40 Hours

SECTION - I

Q2. Write short answers to any EIGHT (8) questions: 16

(i) What are Globular proteins? Give examples. (MLN. GI, 2017)

(ii) Differentiate between Heat Capacity and Heat of Water Vaporization. (BWP. 2015)

(iii) Differentiate between competitive and non-competitive inhibitors. (LHR. GII, BWP. 2018)

(iv) Compare Pepsin with Pepsinogen. (SGD. 2014) (LHR. GI, RWP. GI, 2017) (MLN. GII, 2018) (FBD. GI, RWP. 2019)

(v) Define co-factor. What is its function? (SWL. 2018)

(vi) How penicillium reproduce? (SGD. GI, 2014)

(vii) Differentiate between mycelium and hyphae. (GRW. DGK. GI, 2018)

(viii) What is haemocyanin? (DGK. GI, 2018) (GRW. 2019)

(ix) Write any two parasitic Adaptations is Flat worms. (AJK. GI, 2015) (DGK. GII, MLN. GI, 2016) (FBD. GI, MLN. GI, 2017)

(x) Write down any four characteristics of class Osteichthyes (Bony Fishes). (DGK. GI, 2017)

(xi) What is meant by anaerobic respiration? Give an example. (BWP. GI, SGD. GI, 2015) (AJK. GI, 2016) (MLN. GII, 2017)

(xii) What are carotenoids? (DGK. GII, 2017) (DGK. GI, 2018)

Q3. Write short answers to any EIGHT (8) questions: 16

(i) Define deductive reasoning and inductive reasoning. (LHR. GII, FBD. GI, 2014) (LHR. GI, GRW. GI, 2016) (LHR. GII, LHR. GI, 2017)

(ii) What is hydroponic culture technique? Give its importance. (FBD. GI, 2014) (MLN. GI, RWP. GI, GRW. GI, 2017) (GRW, FBD. GI, DGK. 2019)

(iii) Give functions of smooth endoplasmic reticulum. (GRW. GI, 2014) (MLN. GI, 2015) (BWP. GI, 2017) (LHR. GI, MLN. GII, SWL. 2018)

(iv) Differentiate between Prokaryotic and Eukaryotic. (DGK. GII, RWP. GI, 2017) (MLN. GI, 2018)

(v) Give the characters of Oomycotes. (SGD. GII, 2015) (FBD. GI, GRW. GI, FBD. GI, 2017

(vi) Write down any two characteristics of protists. (DGK. GI, 2018

(vii) What are the basis of diversity in protista? (LHR. GII, 201

(viii) Define circinate vernation. Give an example. (LHR. GII, 201

(ix) Write four characteristics of bryophytes. (LHR. GI, 2014) (DGK. GI, 201

(x) What are lymph nodes? What is their function? (SWL. GI, 2014) (BWP. 20

(xi) Define Antigen and Antibody. (GRW. GI, 2017) (AJK. 20

(xii) What is Passive Immunity? (MLN. GI, 2016) (MLN. GI, 20

12

Q4. Write short answers to any SIX (6) questions:

(i) What is binomial nomenclature? What are the rules of nomenclature? (GRW, BWP, 2018) (BWP, 2016) (GRW, GI, BWP, GI, 2015) (DGK, GII, 2016) (LHR, GII, BWP, GI, 2017) (GRW, BWP, 2018) (BWP, 2016) (GRW, GI, BWP, GI, 2015) (DGK, GII, 2016) (LHR, GII, BWP, GI, 2017)

(ii) Differentiate between lytic and lysogenic phage. (LHR, GI, 2014) (SGD, GI, 2015) (DGK, GI, 2016)

(iii) What are trichomes? Give the structure and function of Heterocysts. (BWP, GI, 2016) (LHR, GI, 2015) (DGK, GI, 2017)

(iv) What are the functions of flagella, pili, slime and capsule in bacterial cell? (BWP, GII, 2016)

(v) What is peristalsis and antiperistalsis? (FBD, GI, MLN, GI, SGD, GI, AJK, 2015) (MLN, GI, SGD, GI, BWP, GII, 2016) (BWP, GI, 2017) (FBD, BWP, 2018) (LHR, GII, MLN, GII, SGD, 2015)

(vi) What is hunger pang? (BWP, GII, 2016) (LHR, GI, AJK, 2016)

(vii) What are the symptoms of Asthma? (MLN, GI, 2018) (SWL, 2016)

(viii) Write down properties of respiratory surfaces in animals. (MLN, GII, SWL, AJK, 2018) (SWL, 2016)

(ix) Write down the disadvantages of gas exchange in water environment? (DGK, GII, 2016)

SECTION - II

Note: Attempt any THREE questions. $3 \times 8 = 24$

Q5. (a) Define the following branches of Biology: 4

i. **Microbiology** ii. **Histology** (AJK, GI, 2016)

iii. **Marine Biology** iv. **Biotechnology**

(b) Describe various functions of blood. 4

(SWL, GI, 2015) (BWP, GI, 2015) (SWL, GI, 2016) (LHR, GII, 2017) (LHR, GI, BWP, 2019)

Q6. (a) Describe fibrous and globular proteins. 4

(SWL, GI, 2016) (BWP, GII, 2017)

(b) Write a note on economic gains due to fungi. 4

(GRW, GI, DGK, GII, AJK, GI, 2015) (SGD, GI, DGK, GII, GRW, GI, 2016) (LHR, GII, GRW, GI, MLN, GI, 2017) (FBD, 2018) (GRW, FBD, GII, 2017)

Q7. (a) Compare Gram positive and Gram negative bacteria on the basics of cell wall. 4

(LHR, GII, SGD, GI, 2016)

(b) Write down the life cycle of adiantum. 4

(FBD, GI, 2015) (LHR, GI, DGK, GII, 2017) (MLN, GII, 2018) (MLN, GII, BWP, AJK, 2019)

Q8. (a) Define virus. Write a note on the characteristics of viruses. 4

(DGK, GII, BWP, 2018) (RWP, 2019)

(b) Describe the role of water in Photosynthesis. 4

Q9. (a) Write a note on Mitochondria. (MLN, GII, RWP, 2018) 4

(SGD, GII, FBD, GI, 2015) (LHR, GI, MLN, GI, 2016) (BWP, GI, GRW, GI, BWP, GII, 2017) (MLN, GI, BWP, 2018) (LHR, GI, FBD, GI, 2019)

(b) Describe the role of large intestine in human digestion. 4

(LHR, GII, 2015) (GRW, GI, 2016) (SWL, RWP, 2018)

Paper No.05

BIOLOGY

Annual Paper 2014-2019

Roll No. ________________ (To be filled in by the candidate)

Maximum Marks: 17 **(OBJECTIVE TYPE)** Time Allowed : 20 Minutes

NOTE: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q1. 17

1. **Internal morphology is also called:** (SGD. 2019)
   - (A) Physiology (B) Anatomy
   - (C) Histology (D) Palaeontology
2. **Human tissue contains about 20% water in:** (GRW. 2019)
   - (A) brain cells (B) bone cells
   - (C) kidney (D) skin cells
3. **Induced fit model was proposed by:** (LHR. GI, 2015) (SGD. GI, 2016)
   - (A) Emil Fischer (B) Koshland
   - (C) Jenner (D) Pasteur
4. **The protein present in microtubules is:** (MLN. GI, 2017) (RWP. 201
   - (A) Actin (B) Tetroses
   - (C) Tubulin (D) Tropomyosin
5. **The infectious proteins are:** (MLN. GI, 2014) (MLN. GII, 2015) (RWP. 20
   - (A) Viruses (B) Viroids
   - (C) Virions (D) Prions
6. **The phase of rapid growth in bacteria is:** (AJK. GI, 2015) (DGK. GI, 2
   - (A) Lag phase (B) Log phase
   - (C) Stationary phase (D) Decline phase
7. **Laminaria is an example of:** (SWL.
   - (A) Red algae (B) Diatoms
   - (C) Green algae (D) Brown algae

(FBD. GII. 20..)

8. **Cell wall of oomycotes contain mostly:**

(A) Chitin (B) Cellulose

(C) Glycan (D) Pectin

9. **Vascular plants belonging to subdivision sphenopsida are commonly called:** (BWP. GI. 2014) (DGK. GII. 20..)

(A) Whisk ferns (B) Club mosses

(C) Horsetails (D) Ferns

10. **The number of pairs of spiracles in abdominal segments of cockroach are:** (GRW. 20..)

(A) 02 (B) 12

(C) 08 (D) 10

11. **Common ectoparasite in non-human mammal is:** (DGK. 20..)

(A) Tics (B) Leech

(C) Tapeworm (D) Flea

12. **Photosystem II has the form of chlorophyll a which absorbs best light of:** (FBD. 20..)

(A) 670 nm (B) 680 nm

(C) 690 nm (D) 700 nm

13. **Haem portion of haemoglobin is also a porphyrin ring but containing an iron at.. instead of:** (MLN. GI. 2018) (LHR. GII. 20..)

(A) Nitrogen atom (B) Potassium atom

(C) Sulpher atom (D) Magnesium atom

14. **Excess gastric secretion is an important factor for:** (SWL. GI. 2014) (SWL. GI. 2015) (RWP. 20..)

(A) Obesity (B) Piles

(C) Food poisoning (D) Peptic Ulcer

15. **Muscles of stomach are of which type?** (LHR. GI. 20..)

(A) Skeletal (B) Smooth

(C) Cardiac (D) Voluntary

16. **Carbon dioxide per 100 ml of venous blood is** (DGK. GI. 2018)

(A) 50 ml (B) 54 ml

(C) 98 ml (D) 99 ml

17. **Basophils produce a substance that inhibits blood clotting.** (LHR. GII. SWL. 2..)

(A) Heparin (B) Platelets

(C) Fibrinogen (D) Eosinophil

Annual Paper 2014 - 2019

Roll No. ______________________ (To be filled in by the candidate)

Maximum Marks: 68 **(SUBJECTIVE TYPE)** Time Allowed: 2.40 Hours

SECTION - I

Q2. Write short answers to any EIGHT (8) questions: **16**

(i) Define protective role of water. (FBD. GI, 2017)

(ii) What do you know about ionization of water? (DGK. 2019)

(iii) Define activators. Give examples. (BWP, DGK. GII, 2018) (MLN. GII, 2019)

(iv) Define co-factor. Write its function. (DGK. GI, 2018) (DGK. 2019)

(v) What are competitive inhibitors? Why they are called reversible inhibitors? (DGK. 2019)

(vi) Why slime molds are included in kingdom protoctista? (LHR. GI, 2019)

(vii) What are zygomycetes? Why they are named so? (MLN. GII, 2016) (DGK. 2019)

(viii) What is blastostyle? (LHR. GII, 201

(ix) Differentiate between anamniotes and amniotes. (AJK. 2018) (DGK. GII, 201

(x) What is honey dew? (MLN. GII, 20

(xi) What is a porphyrin ring of a chlorophyll molecule? (GRW. 2018) (SWL. 20

(xii) What do you know about flame cells? (FBD. GII, 20

Q3. Write short answers to any EIGHT (8) questions:

(i) Define ecosystem with an example. (LHR. GI, 2

(ii) What is Hydroponic culture technique? Give its use. (LHR. GI, 2015) (SWL, SGD. 2

(iii) How intermediate filaments support cell? (LHR. GI,

(iv) What are chromoplasts? (DGK.

(v) Why green algae are considered as ancestors of green land plants? (FBD. GII, 2014) (AJK.

(vi) Explain red tides. (GRW. GII, 2015) (GRW. GI, 2014) (LHR. GI, 2018) (GRW. MLN. GII,

(vii) What is Mantle? (MLN. GII, SWL.

(viii) What are gymnospermae? Give examples. (SGD. GI, 2015) (LHR. GII, 2016) (MLN. GI

(ix) What are lenticels? Write their use. (LHR. G

(x) Differentiate between Thrombus and Embolus. (LHR. GII, BWP. GI, 2017) (MLN. G

(xi) What is meant by systemic circulation? (BWP. 2018) (LHR. GII, FBD. G

(xii) Define plasmolysis and deplasmolysis. (FBD.

12

Q4. Write short answers to any SIX (6) questions: (GRW, GII, 2017)

(i) Write a short note on AIDS. (SWL, 2018)

(ii) What are mumps and measles? (LHR, GI, MLN, GI, 2018)

(iii) What is capsid and capsomeres? (SWL, GII, 2018)

(iv) What are plasmids and what is their role in genetic engineering?

(v) Describe the three kinds of cells present in gastric glands.
(FBD, GI, BWP, GI, 2014) (SGD, GII, 2015) (SGD, GI, SWL, GI, 2016)

(vi) Write the composition of pancreatic juice. (GRW, GI, LHR, GI, 2017) (LHR, GII, 2018)

(vii) How haemoglobin differ from myoglobin?
(SGD, GI, 2015) (FBD, GI, 2016) (MLN, GII, 2017) (MLN, GII, 2018)

(viii) How pH and temperature effect capacity of haemoglobin to combine with oxygen?
(BWP, 2018) (MLN, GI, 2018)

(ix) How much Carbon dioxide is present in venous and arterial blood? (MLN, GII, SGD, 2018)

SECTION - II

$3 \times 8 = 24$

Note: Attempt any THREE questions.

Q5. (a) Differentiate between deductive and inductive reasoning with examples. 4
(LHR, GI, FBD, GI, BWP, GI, MLN, GI, 2014) (DGK, GI, 2015)

(b) Define immunity. Give its types. 4
(FBD, GI, 2014) (FBD, GI, 2015) (DGK, GII, 2016) (LHR, GI, BWP, 2018) (SGD, 2018)

Q6. (a) Describe primary and secondary structure of protein. 4
(SGD, GI, 2014) (SGD, GII, 2015) (FBD, GI, AJK, GI, 2016)
(SWL, GI, 2017) (SWL, SGD, DGK, GII, 2018) (LHR, GI, GRW, MLN, GII, 2018)

(b) Give an account of Ascomycotes. 4
(MLN, GI, 2016) (DGK, GI, 2017) (LHR, GII, DGK, GII, 2018) (SGD, 2018)

Q7. (a) Write a note on use and misuse of antibiotic. 4
(MLN, GI, 2015) (MLN, GI, SGD, GI, 2016) (FBD, GI, LHR, GI, 2017) (FBD, GI, 2018)

(b) Describe the life cycle of an angoispermic plant. 4
(DGK, GI, 2015) (FBD, GI, 2018)

Q8. (a) Sketch the infection cycle of HIV. 4
(GRW, GI, GII 2014) (GRW, GII, 2015) (AJK, GI, DGK, GI, 2016) (MLN, GII, 2017)

(b) Draw glycolysis. Give its energy balance. 4
(FBD, DGK, BWP, 2017)

Q9. (a) Describe the structure and function of plasma membrane. 4
(AJK, GI, SWL, GI, 2016) (DGK, GI, 2017) (SWL, BWP, AJK, 2018)

(b) Discuss Heterotrophic Nutrition methods in plants. 4
(SGD, GII, 2015) (DGK, GII, 2017) (SWL, DGK, 2018)

Answers

PAPER NO. 1

OBJECTIVE TYPE

Q.1 Multiple choice questions.

1.	Microbiology	2.	574 kcal/kg	3.	Coenzyme	4.	Mitochondria
5.	DNA Enveloped Virus	6.	Nitrates	7.	Diatoms	8.	Smut fungi
9.	Pylorus	10.	Pseudocoelom	11.	Acoelomates	12.	7.3 k cal
13.	Chemiosmosis	14.	Parietal cells	15.	Parasite	16.	50 Times
17.	Endodermis						

SUBJECTIVE TYPE

(Section – I)

Q.2 Short answer questions.

(i) **What is Biochemistry? Give its importance.**

Ans. Biochemistry: Biochemistry is a branch of Biology, which deals with the study of chemicals components and the chemical process in living organisms.

Importance: A Basic knowledge of biochemistry is essential for understanding anatomy and physiology, because all of the structures of an organism have biochemical organization, e.g., photosynthesis, respiration, digestion, muscles contraction etc. can be described in biochemical terms.

(ii) **What is heat capacity of water? Give its importance.**

Ans. Heat Capacity of Water: Water has great ability of absorbing heat with minimum change in its own temperature.

The specific heat capacity of water is the number of calories required to raise the temperature of 1g of water by 1°C (from 15°C to 16°C) i.e. 1.0. This is because much of the energy is used to break hydrogen bonds.

Importance of Heat Capacity of Water: Water works as temperature stabilizer for organisms in the environment and hence protects living material against sudden thermal changes.

(iii) **Define enzymes.**

Ans. Enzymes: Enzymes are biochemical catalysts which increase the rate of reaction by lowering the activation energy of the reaction. They are very specific in their action and are globular protein in nature.

Examples: Pepsin, Amylase etc.

(iv) **What are cofactor and activator of enzyme?**

Ans. Co-Factor: Co-factor is a non-protein part which is essential for the proper functioning of the enzyme. Cofactor provides a source of chemical energy, helping to drive reaction which would otherwise be difficult or impossible.

Activator: The detachable cofactor is known as an activator. It is inorganic metal ion used by enzymes for their proper functioning, e.g., Mg^{2+}, Fe^{2+} etc.

(v) How does an enzyme accelerate a metabolic reaction?

Ans. Enzyme lowers the amount of activation energy needed. The reduction in activation energy, by the enzyme, accelerates a metabolic reaction.

(vi) What is nuclear mitosis?

Ans. **Nuclear Mitosis:** Fungi shows a characteristic type of mitosis called nuclear mitosis in which nuclear envelop does not break instead the mitotic spindle forms within the nucleus and the nuclear membrane constricts between the two clusters of daughter chromosomes.

(vii) Define hyphae. Give their two types.

Ans. **Hyphae:** The body of fungus consists of long slender, branched tubular thread like filaments called the hyphae.

Types: There are two types of hyphae:

1. **Septate Hyphae:** Septate hyphae are divided by crosswalls called septa into individual cells containing one or more nuclei.
2. **Non Septate Hyphae:** Non septate hyphae lack septa and are not divided into individual cells; instead these are in the form of an elongated multinucleated large cell. That's why non septate hyphae are also called coenocytic hyphae.

(viii) Why Annelids and Arthropods are considered having same origin?

Ans. Annelids and Arthropods have same origin because both share the characteristics of having body divided into similar segments, appendages and cuticle.

(ix) Differentiate between schizocoelous and enterocoelous coelom.

Ans.

Schizocoelous Coelom	Enterocoelous Coelom
Coelom or body cavity which is formed by splitting of mesoderm is termed as schizocoelous coelom.	Coelom which is developed as an outpouching of archenterons is termed as enterocoelous coelom.

(x) What are diploblastic animals?

Ans. **Diploblastic Animals:**

Diploblastic animals belongs to division radiate. The body of these animals consists of two layers of cells: ectoderm and endoderm. Diploblastic animals show lesser degree of specialization and do not form specialised organs.

Example: Diploblastic animals are included in phylum Cnidaria (coelenterate).

(xi) Define bioenergetics.

Ans. **Bioenergetics:** Bioenergetics is the quantitative study of energy relationships and energy conversions in biological systems.

(xii) What are aerobic and anaerobic respiration?

Ans. **Aerobic Respiration:** Respiration that occurs in the presence of oxygen is called aerobic respiration.

Anaerobic Respiration: Respiration that occurs in the absence of oxygen is called anaerobic respiration.

Q.3: Short answer questions.

(i) What are bio-elements? Give their proportion in human body.

Ans. **Bio - Elements:** Elements which occur in living organisms are called bioelements.

Proportions of bioelements in humans are:

Oxygen (65%), carbon (18%), hydrogen (10%), nitrogen (3%), calcium (2%) an

phosphours (1%).

(ii) **Write the names of four eras of geological time chart.**

Ans. The names of four eras of geological time chart are

1. Proterozoic 2. Palaeozoic 3. Mesozoic 4. Cenozoic

(iii) **What is plasma membrane? Give its composition.**

Ans. **Plasma Membrane:** Plasma membrane or cell membrane is the outer most boundary of the cell. However, in most plant cells, it is covered by a cell wall.

Composition: Plasma membrane is chemically composed of lipids and proteins; 60-80% are proteins, while 20-40% are lipids. In addition there is a small quantity of carbohydrates.

(iv) **Define fluid mosaic model of the cell membrane.**

Ans. **Fluid Mosaic Model:** "According to fluid mosaic model, the membrane structure includes a lipid bilayer with several types of proteins embedded and protruding". At normal biological temperatures, the plasma membrane acts like a thin layer of fluid across which proteins move freely, like icebergs in a lipid sea. Cell membrane contains charged pores through which movement of materials take place, both by active and passive transport.

(v) **Write two distinguishing characters of kingdom protista.**

Ans. **Characteristics of Kingdom Protista:**

1. Protists do not develop from a blastula or an embryo.
2. Protists are polyphyletic group of organisms as they do not share a single common ancestor.

(vi) **Write a note on plasmodium causing disease.**

Ans. Plasmodium is the apicomplexan which cause malaria. It enters human blood through the bite of an infected female anopheles mosquito.

1. Plasmodium first enters liver cells and then red blood cells, where it multiplies.
2. When each infected RBC cell bursts, many new parasites are released.
3. The released parasites infect new RBCs and the process is repeated. The simultaneous bursting of millions of RBCs causes the symptoms of malaria. Symptoms of malaria: chill, followed by higher fever, caused by toxic substances that are released and affect other organs of the body.

(vii) **Write down two similarities and differences between fungi and fungus like protists.**

Ans. **Similarities between fungi and fungus like protists:**

Some protists superficially resemble fungi in that.

1. They are not photosynthetic.
2. Some have bodies formed of thread like structures called hypae.

Differences between fungi and fungus like protists

The fungus like protists are not fungi for several reasons.

1. Many of protists have centrioles which is not found in fungi.
2. They produce cellulose as a major component of their cell walls, whereas fungi hav[e] cell walls of chitin.

(viii) **What is phylogenetic system of classification?**

Ans. **Phylogenetic System of Classification:** The system of classification which is based o[n] evolutionary history of organisms is known as phylogenetic system of classification.

(ix) Differentiate between ovule and seed.

Ans.

Ovule	Seed
An ovule is a megasporangium containing female gametophyte and one or two integuments, layer of sporophytic tissue that surround and enclose the megasporangium.	Seed is very important structure in angiosperms as it leads to next generation. It has protective covering so it can survive in dry conditions and can tolerate unfavourable condition. Whenever it finds suitable environment it will germinate.

(x) Give the role of platelets.

Ans. Role of platelets: The main function of platelets is blood clotting. In this process they cause conversion of fibrinogen, a solid plasma protein, into insoluble form fibrin. The fibrin thread enmesh (catch) red blood cells and other platelets in the area of damaged tissue, ultimately forming a blood clot. The clot serves as a temporary seal to prevent bleeding until the damaged tissue can be repaired.

(xi) Differentiate between apoplast and symplast pathway.

Ans.

Apoplast Pathway	Symplast Pathway
1. In a plant root, the compartment made up of all extracellular spaces, along with the spaces within cell walls that water can traverse without crossing any plasma membrane. 2. Apoplast pathway is of greater important for both water and solutes.	1. Symplast pathway is a system of interconnected protoplasts in the root cells in which cytoplasm of neighboring cells is connected with one another by plasmodesmata. 2. Symplast pathway is less important except for salts in the region of the endodermis.

(xii) Define Imbibition. Who worked on it?

Ans. Imbibition: "Imbibition is a process in which water enters soil and binds to clay and humus particles then root cell walls imbibe water from the soil and this water moves by apoplast pathway".

Q.4: Short answer questions.

(i) Define species. Give one example.

Ans. Species: "A species is a group of natural population which can interbreed freely among themselves and produce fertile offsprings, but are reproductively isolated from all other such group in nature."

Example: Corn, man etc.

(ii) Viruses are intracellular obligate parasites. Comment.

Ans. Viruses are intracellular obligate parasite because viruses lack metabolic machinery for the synthesis of their own nucleic acid and protein. They depend on the host cell to carry out these vital functions. During reproduction in the host cells, viruses may cause disease.

(iii) Differentiate between lophotrichous and amphitrichous.

Ans.

Lophotrichous	Amphitrichous
If tuft of flagella is present only at one pole of bacteria then these are lophotrichous flagell.	A amphitrichous is a condition when tuft of flagella at each of two poles is present.

(iv) **What are pili? Give their functions.**

Ans. Pili: Pili are hollow, non helical, filamentous appendages. Pili are smaller than flagella. They are made up of special protein called pilin. True pili are only present on gram negative bacteria.

Functions of Pili:

1. Pili are primarily involved in a mating process between cells called conjugation process.
2. Some pili function as a means of attachment of bacteria to various surfaces.
3. Pili are not involved in motility.

(v) **How Sundew (Drosera) show its insectivorous activity.**

Ans. In Sundew, the tiny leaves bear numerous hair like tentacles, each with a gland at its tip. The insects attracted by the plant's ordour cause nearby tentacles to bend over the animals thus they become entangled. In sundew also the proteins of insects are digested by enzymes and the products are absorbed.

(vi) **What is Holozoic Nutrition?**

Ans: Holozoic Nutrition: The nutrition in which complex, non-diffusable food is taken in and digested into smaller diffusible molecules which can be absorbed and assimilated is called holozoic nutrition. It is found in free living animals which have a specialized digestive tract in which various processes occur. holozoic nutrition is achieved by ingestion, digestion, absorption, assimilation and egestion.

(vii) **In what way air is a better respiratory medium than water?**

Ans. Followings are the reasons to explain that air is a better respiratory medium than water and oxygen can be obtained more easily from air than from water:

1. Oxygen content of air is much higher than the oxygen content of equal volume of water.
2. Oxygen diffuses about 8000 times more quickly in air than in water because water is 8000 times more dense than air.
3. Water is 50 times more viscous than air.

(viii) **What is importance of rubisco?**

Ans. Rubisco: Ribulose bisphosphate carboxylase oxygenase is an enzyme which is the most abundant protein in chloroplasts and probably the most abundant protein in the world.

The rubisco acts as carboxylase, as well as oxygenase.

When rubisco acts as carboxylase, it adds CO_2 to RuBP, which is an acceptor molecule.

On the other hand, when rubisco is oxygenase it adds oxygen to RuBP.

(ix) **What are parabronchi?**

Ans. Parabronchi:

In the lungs of birds, tiny thin walled ducts called parabronchi are present instead of alveoli. These parabronchi open at both ends and the air is constantly ventilated. The walls of parabronchi are chief sites of gaseous exchange.

Counter Current Exchange: The direction of the blood flow in the lungs is opposite to that of the air flow through the parabronchi. This counter current exchange increases the amount of oxygen which enters blood. Lungs in birds are very efficient in this respect as well, because no stale of air remains in the parabronchi.

(SECTION – II)

Note: Attempt any THREE questions.

Q5. (a) Differentiate between deductive and inductive reasoning with examples.

(b) Describe the two hypotheses to explain the opening and closing of stomata.

Q6. (a) Discuss water as medium of life. Also give its importance.

(b) Discuss taxonomic status of fungi.

Q7. (a) Describe different classes of bacteria on the basis of flagella.

(b) Write a note on adaptation of Bryophytes for life on land.

Q8. (a) Discuss the five Kingdom system of classification proposed by Robert Whittaker.

(b) Draw and describe Calvin cycle in photosynthesis.

Q9. (a) Write a detailed note on Endoplasmic Reticulum.

(b) Discuss the process of nutrition in insectivorous plants.

PAPER NO. 2

OBJECTIVE TYPE

Q.1: Multiple choice questions.

1.	Biome	2.	Glycoproteins	3.	Mitochondria	4.	Cytosol
5.	Virus	6.	Lophotrichous	7.	Zooflagellates	8.	Deuteromycota
9.	Gametophyte	10.	Echinodermata	11.	Annelida	12.	Compensation point
13.	1 - 2%	14.	Nitrogen	15.	Duodenum	16.	Photorespiration
17.	Imbibition						

SUBJECTIVE TYPE

(Section – I)

Q.2: Short answer questions.

(i) What are lipids? Give two functions of waxes.

Ans. Lipids: The lipids are the heterogeneous group of compounds related to fatty acids are insoluble in water but soluble in organic solvents such as ether, alcohol, chloroform and benzene etc. lipids include fat, oil, waxes, cholesterol and related compounds.

Function of waxes:

1. Waxes are wide spread as protective coatings on fruits and leaves.
2. Waxes protect plants from water loss and abrasive damage.

(ii) How many chains of amino acids are present in hemoglobin, also mention number of amino acids in hemoglobin.

Ans. There are four chains in hemoglobin two alpha and two beta chains, total amino acids are 574.

(iii) What is active site of an enzyme? How it works?

Ans. Active Site: "The active site of an enzyme is a small portion of the globular structure to which catalytic activity is restricted".

(x) Give beneficial effects of insects.

Ans. Beneficial / effects of Insects:

1. Honey bee provides man with honey and wax.
2. Silk worm gives us silk.
3. Insects larvae are source of food for fish.
4. Some insect are predaceous on other harmful insects.

(xi) Write down the molecular formula for chlorophyll "a" and "b".

Ans. The molecular formula of chlorophyll a and b are:

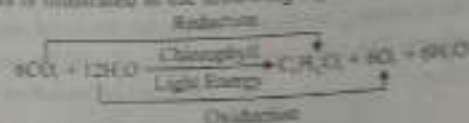
Chlorophyll a: $C_{55}H_{72}O_5N_4Mg$ **Chlorophyll b:** $C_{55}H_{70}O_6N_4Mg$

(xii) Why photosynthesis is called Redox Process? Illustrate with equation.

Ans. Photosynthesis is called Redox process because in this process, CO_2 is reduced and water is oxidized.

Illustration: This is illustrated in the following equation.

$$6CO_2 + 12H_2O \xrightarrow[\text{Light Energy}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

(Reduction) (Oxidation)

Q.3: Short answer questions.

(i) Define biodiversity. Give the percentage of different groups of organisms.

Ans. Biodiversity: Biodiversity refers to the number and variety of species in a place.

Percentage of Different Groups of Organisms:

More than half of organisms are insect (53.1 %), vascular plants (17.6 %), animals other than species are 19.9% (281, 000 species) and 9.4 % are fungi, algae, protozoa, and various other prokaryotes.

(ii) Define population, describe its attributes.

Ans. Population: Members of one species inhabiting the same area in a specific time are collectively called population.

Attributes of Population: Attributes of population are:

1. gene frequency 2. gene flow 3. age distribution
4. population density 5. population pressure

(iii) Why is mitochondrion called self replicating organelle?

Ans. It is called self replicating organelle because metochondria can increase number without involving the cell division when ever cell needs more mitochondria.

(iv) How cell wall of plants differ from prokaryotes?

Ans. The outermost boundary in most of the plant cells is cell wall. The cell wall of plants is different from the prokaryotes in structure and chemical composition. It is secreted by the protoplasm of the cell. The thickness of cell wall is different in different types of cells. Cell wall is composed of three main layers: primary wall, secondary wall and middle lamella.

Cell wall of Prokaryotes: Prokaryotes cell wall lacks cellulose. Their wall is composed of peptidoglycan or murein.

(v) What are choanoflagellates?

Ans. Choanoflagellates: Choanoflagellates are sessile and colonial zooflagellates which are marine or fresh water in habitat, choanoflagellates are attached by a stalk and their single

flagellum is surrounded by delicate collar, choanoflagellates are of special interest because of their striking resemblance to collar cells i.e., choanocytes in sponges.

(v) **Differentiate between micronucleus and macronucleus in ciliates.**

Ans.

Micronucleus	Macronucleus
1. Micronuclei are diploid.	1. Macronuclei are polyploid.
2. Micronuclei are small and one or more in number.	2. Macronuclei are larger and one in number.
3. Micronuclei are involved in sexual process.	3. Macronuclei are involved in controlling cell metabolism and growth.

(vi) **Basically the kingdom protista is defined by exclusion. How?**

Ans. Basically kingdom protista is defined by exclusion i.e. all members have characteristics that exclude them from the other four kingdoms.

(vii) **What are fronds, in which group they are found?**

Ans. **Fronds:** Fronds are (Compound) leaves of a fern bearing leaflets known as pinnae and pinnules. When the frond is immature and young, it is coiled, this pattern of development is called circinate vernation. It is an important character of ferns.

(ix) **Define ovule and embryo sac.**

Ans. **Ovule:** An ovule is an integumented indehiscent megasporangium.

Embryo sac: It is the female gametophyte of a seed plant consisting of a thin walled sac within the nucellus that contains the egg nucleus and other nuclei which give rise to endosperm on fertilization.

(x) **What do you know about bleeding in plants?**

Ans. **Bleeding in plants:** Sometimes, it so happens that certain plants, when cut, pruned, tapped or otherwise wounded, show a flow of sap from the cut ends or surfaces quite often with a considerable force. The phenomenon is called bleeding.

(xi) **What are lenticels?**

Ans. **Lenticels:** Lenticels are one of numerous pore like sites in the cork layer of bark at which gaseous exchange can take place and water is lost in the form of water vapours.

(xii) **Write a note on single circuit heart.**

Ans. **Single Circuit Heart:** Single circuit heart is one in which the blood flows in one direction only. Single circuit heart never receives oxygenated blood. Only deoxygenated blood passes through the heart.

Example: The heart of fish functions as a single circuit heart.

Q.4 Short answer questions.

(i) **Differentiate between the capsid and capsomere.**

Ans.

Capsid	Capsomere
Capsid is a protein coat which surrounds the genome of virus. Capsid gives a definite shape to virus.	Capsid is made up of protein subunits known as capsomeres.

(ii) **Write four symptoms of AIDS.**

Ans. **Symptoms of AIDS:**

1. Rare vascular cancer
2. Sudden weight loss
3. Swollen lymph nodes
4. General loss of immune function.

(iii) **What are plasmids? Give their significance.**

Ans. Plasmids: Plasmid is an extrachromosomal DNA present in bacteria. These are circular double stranded DNA molecules and are self replicating. They are not essential for bacterial growth and metabolism.

Significance:

1. Plasmids are important vectors in modern genetic engineering techniques.
2. Plasmids often contain drug resisting, heavy metals, disease and insect resistant genes on them.

(iv) **What are mesosomes? Write their role.**

Ans. Mesosomes: The cell membrane of bacteria invaginates into the cytoplasm forming structure called as mesosome. Mesosomes are in the form of vesicles, tubules or lamellae.

Functions of mesosomes:

1. Mesosomes are involved in DNA replication.
2. Mesosomes are involved in cell division.
3. Some mesosomes are involved in export of exocellular enzyme.
4. Respiratory enzyme are present on the mesosomes.

(v) **Name the parts of three main divisions of the digestive system of cockroach.**

Ans: Divisions of Digestive System of Cockroach: The parts of three main divisions of the digestive system of cockroach are as follows.

1. **Foregut or stomodaeum:** It includes mouth cavity with a pair of salivary glands, pharynx, crop, gizzards.
2. **Midget or Mesenteron:** Stomach with eight hepatic caecae.
3. **Hindgut or Proctodaeum:** Illeum or small intestine, large intestine or colon, rectum with anus.

(vi) **Define Parabronchi and Bronchioles.**

Ans. Parabronchi: In the lungs of birds, tiny thin walled ducts called parabronchi are present. These parabronchi open at both ends and the air is constantly ventilated. The walls of parabronchi are main sites of gaseous exchange.

Bronchioles: When the smaller bronchi in humans attain a diameter of one mm or less, then they are called bronchioles. Bronchioles are made up of mainly circular smooth muscles.

(vii) **What is larynx or voice box?**

Ans. Larynx: Larynx is a complex cartilaginous structure surrounding the upper end of trachea. The opening of the larynx is called glottis which is covered by an automatically controlled lid called epiglottis to prevent the entry of food or liquids into the larynx. Due to presence of vocal cords in larynx, it is also known as voice Box.

(viii) **What are bronchi and alveoli?**

Ans. Bronchi: When trachea extends to the chest cavity or thorax, it is divided into right and left bronchi and enters into right and left lungs respectively.

Alveoli: The bronchioles divide and subdivide deep into the lungs and finally open into a large number of air sacs. Each air sac consists of several microscopic single layered structures called Alveoli.

Function of Alveoli: Alveoli are sites for exchange of gases as there is a rich network of

blood capillaries overlying the alveoli.

(iii) What are causes and symptoms of pulmonary tuberculosis?

Ans. **Causes of Symptom:** Pulmonary tuberculosis is a disease of lungs in which inside of lungs is damaged resulting in cough and fever. It is common in poor people.
Tuberculosis general name is T.B of a group of disease cause by Mycobacterium tuberculosis.

(SECTION – II)

Note: Attempt any THREE questions.

Q5. (a) What is hypothesis? Discuss briefly the deductive and inductive reasonings.
(b) Describe the composition of blood plasma.

Q6. (a) Give importance of water in nature.
(b) How asexual reproduction occurs in fungi.

Q7. (a) Discuss the process of Nutrition in Bacteria.
(b) Describe gametophyte stage in the life history of Adiantum.

Q8. (a) Describe Life Cycle of Bacteriophages. (labelled diagram)
(b) What is Glycolysis? Sketch its various steps only.

Q9. (a) Described the structure and functions of Chloroplast.
(b) Describe digestion in oral cavity of man.

PAPER NO. 3

OBJECTIVE TYPE

Q.1: Multiple choice questions.

1. Social biology	2. 10-20%	3. Prosthetic group	4. Mucor
5. Tomato	6. Pilin	7. Trypanosoma	8. Lead bands
9. Liverworts	10. Hemichordata	11. platyhelminthes	12. T.W. Engelmann
13. Stroma	14. Amylase	15. Parietal cells	16. Emphysema
17. 7.4			

SUBJECTIVE TYPE

(Section – I)

Q.2: Short answer questions.

(i) **What F. Sanger concluded about insulin?**

Ans. **Sequence of Insulin molecule:** F. Sanger determines the sequence of first protein molecule. Sanger worked on insulin for ten years. He found that insulin is composed of 51 amino acids. It has two chains of amino acids. One chain has 21 amino acids. The other chain has 30 amino acids. Both these chains are held together by disulphide bridges (bonds).

(ii) **Define heat of vaporization. What is heat of vaporization of water?**

Ans. **Heat of vaporization:** The amount of heat energy that must be supplied to change one gram of a substance from liquid phase to the vapor phase is called heat of vaporization.
The heat of vaporization of water is 574 kcal/kg (1 kilo calories = 1000 calories).

(iii) **What are competitive and non-competitive enzyme inhibitors?**

Ans. **Competitive Inhibitors:** Competitive inhibitors because of the structural similarity with [illegible]

substrate may be selected by the binding sites, but are not able to activate the catalytic sites. Thus product is not formed.

Non-competitive Inhibitors: Non-competitive inhibitors form enzyme inhibitor complex at a point other than the active site. They alter the structure of the enzyme in such a way that even if genuine substrate binds the active site, catalysis fails to take place.

(iv) **What is induced fit model of enzyme action, who proposed it?**

Ans. **Induced Fit Model of Enzyme Action:**

Koshland (1959) proposed Induced Fit model of enzyme action. He argued that when a substrate combines with an enzyme, it induces changes in the enzyme structure. The structure in enzyme enables the enzyme to perform its catalytic activity more effectively.

(v) **What is an apoenzyme?**

Ans. **Apoenzyme:** An enzyme without its coenzyme, or prosthetic group is called an apoenzyme.

(vi) **Why are toadstool called death angel?**

Ans. Toadstools are poisonous mushrooms. They contain poisonous alkoloids that affect the human nervous system, sometimes with fatal results if they are consumed. So they are called death angel.

(vii) **What do you mean by budding and parasexuality?**

Ans. **Parasexuality:** Parasexuality is a special kind of genetic recombination in imperfect fungi in which portions of chromosomes of two nuclei lying in the same hypha are exchanged.

Budding: Budding is an asymmetric division in which tiny outgrow or bud is produced which may separate or grow or by simple relatively equal cell division. Unicellular yeasts reproduce by budding.

(viii) **What are harms caused by insects?**

Ans. **Harmful effects of Insects:**

1. Many types of mosquitoes, flies, fleas, lice and bugs transmit disease causing organisms to man and domestic animals.
2. The common house fly carries disease causing organisms to contaminate food and cause cholera, hepatitis etc.
3. Some species of Trypanosoma cause disease in cattle.
4. A number of insects lay eggs on fruits and other commercial crops such as sugar-cane, maize, cotton and also on vegetable etc. The larvae of these insects damage fruits and the crops resulting in economic loss to farmers, e.g, Locusts.

(ix) **Give three basic characteristics of chordates.**

Ans. **Basic characteristics of chordates:** All chordates possess three basic characters which are as follows:

1. All chordates possess the Notochord.
2. All chordates have central nervous system that is dorsal in position and is hollow.
3. All chordates develope paired gill openings in embryonic stage.

(x) **What are nematocysts? Give their function.**

Ans. **Nematocysts:**

1. Nematocysts are the stinging cells, embedded in tentacles and are developed from cnidocytes.

2. Nematocysts are characteristics of phylum coelenterate.

Function of Nematocysts:

1. Each nematocysts consists of a hollow thread coiled within a capsule and a tiny hair like trigger, projecting outside.
2. When a prey such as Daphnia or Cyclops comes in contact with the cnidocil the hollow thread of the nematocyst turns inside out, ejects poison and the prey is paralyzed or sometimes killed.

(xi) **Differentiate between photosystem I and photosystem II.**

Ans.

Photo System I	Photo System II
1. Photo system I has chlorophyll a molecule which absorb maximum light of 700 nm is called P_{700}.	1. Photo system II Has chlorophyll a molecule which absorbs maximum light of 680 nm is called P_{680}.
2. Photo system I is involved in both non-cyclic and cyclic phosphorylation.	2. Photo system II is involved only in non-cyclic phosphorylation.

(xii) **Define Chemiosmosis.**

Ans. Chemiosmosis: The coupling reaction in which synthesis of ATP molecule takes during movement of H^+ across and an H+ gradient is called chemiosmosis. The mechanism for the ATP synthesis is chemiosmosis in cyclic and non-cyclic phosphorylation. It is a process that uses membranes during redox reaction for ATP production.

Q.3: Short answer questions.

(i) **Define the term biome with example.**

Ans. Biome: "A biome is a large regional community primarily determined by climate."

Example: forest, grassland, desert etc.

(ii) **What is deductive reasoning? Give one example.**

Ans. In deductive reasoning a specific conclusion is drawn from a general rule or principle.

Example: If we accept that all the birds have wings and that sparrow is a bird, then we must conclude that sparrow must have wings.

(iii) **Give Important Functions of Cytoplasm.**

Ans. Functions of Cytoplasm:

1. The most important function of the cytoplasm is to act as a store house of vital chemicals.
2. It is also a site for certain metabolic process such as glycolysis.
3. A variety of cell organelles and other inclusions such as insoluble waste and storage products are present in cytoplasm.

(iv) **Define polysome and ribosomes.**

Ans. Polysome: A group of ribosomes attached to mRNA is known as polysome.

Ribosomes: The factory of protein synthesis in the cells is the ribosomes.

Each ribosome consists of two parts.

1. Ribosomal RNA (rRNA)
2. Two protein subunits

(v) **How Algae differ from plants?**

Ans.

Algae	Plants
1. Sex organs in algae are unicellular.	1. Sex organs in plants are multicellular.
2. In Algae, zygote is not protected by the parent body.	2. In plants, zygote is protected by the parent body.

3. The body is thallus in Algae. 4. Algae are aquatic photosynthetic protists.	3. The body is foliose in plants. 4. Plants are terrestrial photosynthetic producers.

(vi) Write a note on Euglenoids.

Ans. Euglenoids: Euglenoids resemble plants and green algae in having similar pigments. Some phosynthetic euglenoids lose their chlorophyll when grown in drak and obtain their nutrients heterotropically by ingesting organic matter, that is why they also resemble zooflagellates.

(vii) Write down the phylum, form, pigments and example of red algae.

Ans. Phylum: Rhodophyta

Form: Red Algae are multicellular or unicellular.

Pigments: Red Algae contains chl.a, carotenes including phycoerythrin as photosynthetic pigment.

Examples: Chondrus, polysiphonia etc.

(viii) Differentiate between homospory and heterospory.

Ans.

Homospory	Heterospory
1. Homospory is a condition in which plants produce same kind of spores.	1. Heterospory is a condition in which plants produce different kind of spores.
2. Homosporous plants produce same kinds of spores.	2. Heterosporous plants produce different kind of spores as under i. Microspore ii. Megaspore
Example: All groups of land plants up to pteridophytes are homosporous.	**Example:** Spermatophytes are heterosporous plants

(ix) Define Flower. What are essential and non-essential parts of flower?

Ans. Flower: Flower is very important reproductive part of plant. It helps in pollination due to its colour, fragrance and nectar.

Essential parts of flower:

Staments and carples are the essentinl or reproductive parts of a flower.

Non-essential parts of flower:

Sepals and petals are the non-essential or non-reproductive parts of a flower.

(x) Differentiate between single and double circuit heart:

Ans.

Single Circuit Heart	Double Circuit Heart
1. Single circuit heart is one in which the blood flows in one direction only.	1. Double cirucuit heart is one in which the blood flows in two directions.
2. Single circuit heart never receives oxygenated blood. Only deoxygenated blood passes through the heart	2. Right side of Double circuit heart contains deoxygenated blood and left side contains oxygenated blood.
Example: the heart of fish functions as a single circuit heart.	**Example:** The heart of amphibians, reptiles, aves and mammals functions as a double circuit heart.

(xi) Define blue baby and its one cause.

Ans. Blue Babies: Failure of interatrial foramen to dose or of ductus arteriosus to fully constrict result in cyanosis of new born known as blue babies.

Cause of Blue Babies: The main cause of blue babies is mixing of blood between two atria and the mixed blood is supplied to the body of new born babies resulting in blueness of skin.

(xiii) **What is stroke?**

Ans. Stroke: If the normal flow of blood is blocked by an embolus or a locally formed thrombus in a blood vessel in the brain and causes necrosis or death of the surrounding neural tissue (owing to lack of O_2). The condition created is known as a brain stroke or cerebral infarction.

Q.3 Short answer questions.

(i) **Write names of four common human viral diseases.**

Ans. Viral diseases: Following are some common viral diseases in humans:

1. Small dox
2. Herpes simplex
3. Influenza
4. Mumps
5. Measles
6. Polio
7. AIDS
8. Hepatitis

(ii) **Write down symptoms and preventions of hepatitis.**

Ans. Symptoms of Hepatitis: Hepatitis is characterized by jaundice, abdominal pain, liver enlargement, fatigue, loss of appetite and sometime fever.

Precautions of Hepatitis: Hepatitis can be controlled by adopting hygienic measures, with routine vaccination and screening of blood tissues of the donor.

(iii) **Distinguish antiseptics from disinfectants.**

Ans.

Antiseptics	Disinfectants
These are chemical agents used to destroy pathogens on living object such as a tissue of human body. They are used on body tissues such as on a wound or before piercing the skin to take blood.	Chemical agents used to destroy pathogens on lifeless object such as a table top are known as disinfectants. They are used on inanimate objects such as table top or equipments used in a surgical operation.
Example: Tincture of iodine, silver nitrate, 70% ethyl alcohol etc.	**Example:** Potassium permanganate, alcohol, formaldehyde.

(iv) **Write a few lines on misuse of antibiotics.**

Ans. Misuse of Antibiotics: Misuse of antibiotics results in problems like drug resistance in micro-organisms ultimately resistance against disease treatments. Misuse antibiotics can interact with the human metabolism and in severe cases can cause death of human beings.

1. Misuse of penicillin can cause allergic reactions.
2. Streptomycin can affect auditory nerves causing deafness.
3. Tetracycline and its related compounds cause permanent discoloration of teeth in young children.

(v) **What are Omnivores? Give their two examples.**

Ans. Omnivores: Omnivores are the animals which eat both plants and animal food. Omnivores have the teeth structurally and functionally intermediate between the extremes of specialization attained by the teeth of herbivores and carnivores.

Examples: 1. Crows 2. Rats

(vi) **Write components and functions of saliva.**

Ans. Components of Saliva: Saliva produced by salivary glands contain following three important ingredients:

1. Water and mucous
2. Sodium bicarbonate and some other salts
3. Amylase or ptyalin

Function of Saliva: Main functions of saliva are Lubrication and Digestion of food in the oral cavity.

(vii) How does carbon dioxide concentration affect the oxygen carrying capacity of blood Hemoglobin?

Ans. Effect of CO_2: When carbon dioxide pressure increases, the oxygen tension decreases, the capacity of hemoglobin to hold oxygen becomes less. In this way increased carbon dioxide, tension favours the greater liberation of oxygen from the blood to the tissues.

(viii) What is asthma? Give its two causes.

Ans. Asthma: Asthma is a serious respiratory disease associated with severe paroxysm of difficult breathing, usually followed by a period of complete relief, with recurrence of attack at more or less frequent intervals.

Causes: Following are main causes of Asthma:

1. Asthma is an allergic reaction to pollen, spores, cold, humidity, pollution etc, which manifests itself by spasmodic contraction of small bronchioles tubes.
2. Asthma results in the release of inflammatory chemicals such as histamines into the circulatory system that cause severe contraction of the bronchioles.

(ix) What is the rate of breathing at rest and during exercise?

Ans. Rate of breathing at Rest: During rest breathing occurs rhythmically ate the frequency of 15 to 20 time per minute in human beings.

Rate of breathing during Exercise: During exercise breathing occurs 40 - 50 breaths per minute.

(SECTION – II)

Note: Attempt any THREE questions.

Q5. (a) Explain the biological method for solving a biological problem.

(b) Give functions of lymphatic system.

Q6. (a) What functions are performed by proteins in the bodies of living organisms?

(b) Describe and draw life cycle of Rhizopus.

Q7. (a) Describe different physical and chemical methods to control bacteria.

(b) Give the list of various steps involved in the evolution of seed Habit?

Q8. (a) Write a note on Acquired Immune Deficiency Syndrome (AIDS).

(b) Explain krebs cycle. (Give only outline of kreb cycle)

Q9. (a) Differentiate between Prokaryotic and Eukaryotic cells.

(b) Explain digestion in human stomach.

PAPER NO . 4

OBJECTIVE TYPE

Q.1: Multiple choice questions.

1. Hypothesis	2. cellulose	3. Emil Fischer	4. Stroma
5. Piyaz (Onion)	6. Sarcina	7. Radiolarians	8. Zygospores

9. Arthrophytes 10. Echinodermata 11. jelly fish 12. Solar energy
13. Glycolysis 14. Absorption 15. 20 - 25 cm 16. 1 mm
17. Liver and spleen

SUBJECTIVE TYPE

(Section – I)

Q.2 Short answer questions.

(i) What are Globular proteins? Give examples.

Ans. Globular Proteins: They have multiple folding of polypeptide. So rather chains are spherical or ellipsoidal. Tertiary structure is the most important in them. They are soluble in aqueous media such as salt solution, solution of acids or bases or aqueous alcohol. They can be crystallized. They disorganize with the change in the physical and physiological environment.

Examples: Enzymes, antibodies, hormones and haemoglobin.

(ii) Differentiate between Heat Capacity and Heat of Water Vaporization.

Ans. Heat Capacity of Water: The specific heat capacity is defined as the number of calories required to raise the temperature of 1 g of water by 1°C (from 15 to 16 °C).

The specific heat capacity of water is 1.0.

Heat of Water Vaporization: Heat of water vaporization is shown as calories absorbed per gram water vaporized. It means to convert 1g of water to 1g of steam at 100°C.

The specific heat of vaporization of water is 574 KCal/kg (1 kilo-calories = 1000 calories).

(iii) Differentiate between competitive and non-competitive inhibitors.

Ans.

Competitive inhibitors	Non - Competitive inhibitors
The competitive inhibitors are reversible inhibitors. They may be selected by the binding sites due to the structural similarity with the substrate. They are not able to activate the catalytic sites. Thus products (S) are not formed.	They form enzyme inhibitor complex at a point other than the active site. They alter the structure of the enzyme in such a way that even if genuine substrate binds the active site, catalysis fails to take place.

(iv) Compare Pepsin with Pepsinogen.

Ans.

Pepsin	Pepsinogen
Pepsin is an enzyme that breaks down proteins into smaller peptides.	Pepsinogen is an inactive form of pepsin.

(v) Define co-factor. What is its function?

Ans. Co-factor: A co-factor is a not-protein part present in some enzymes. It is necessary fo the proper functioning of the enzymes. The co-factor usually acts as "bridge" between th enzyme and its substrate. Often, it contributes directly to the chemical reactions whic bring about catalysis.

Function: Sometimes, the co-factor provides a source of chemical energy, helping to driv reactions which would otherwise be difficult or impossible.

(vi) How penicillium reproduce?

Ans. Reproduction in Penicillium: Pencillium reproduces asexually by means of naked spor called conidia. These are found in chain at the tips of special hyphae called conidiophore

Brush-like arrangement of its conidia is characteristic of penicillium. These conidia give colour to the mycelia colony, which is circular. Mature conidia are easily and readily dispersed.

(vii) Differentiate between mycelium and hyphae.

Ans.

Hyphae	Mycelium
Hyphae is a long, slenderer, branched tubular, thread like filaments of which mycelium is composed of.	The body of a fungus is called mycelium (except yeasts which is non-hyphal unicellular fungi).

(viii) What is haemocyanin?

Ans. Haemocyanin: Hoemocyanin is a respiratory pigment. Hoemocyanin is found in many species of molluscs and arthropods. Haemocyanins are blue copper containing protein and they do not have porphyrin or hoeme group. When oxygen combines with copper the compounds become blue, as without oxygen haemocyanin is colourless.

(ix) Write any two parasitic Adaptations is Flat worms.

Ans. Parasitic Adaptations in Flatworms:

1. The complexity of life cycle and presence of more than one host during the life cycle is an important parasitic adaptation.
2. Flatworms have developed adhesive organs, such as suckers and hooks, for attachment to the host.

(x) Write down any four characteristics of class Osteichythes (Bony Fishes).

Ans. Class Osteichythes (Bony fishes): They show following characteristics:

1. They have almost bony skeleton. It has replaced the cartilaginous skeleton.
2. Small part of notochord may persist.
3. Dermal scales are embedded in the skin. These scaled may be ganoid, cycloid or ctenoid. Placoid scales are absent in them.
4. They have both unpaired (median) and paired fins. These fins have cartilaginous or bony fin rays.

(xi) What is meant by anaerobic respiration? Give an example.

Ans. Anaerobic Respiration/Fermentation: Incomplete breakdown of glucose in the absence of air is known as anaerobic respiration or fermentation.

(xii) What are carotenoids?

Ans. Carotenoids: Carotenoids are yellow, red and orange accessory pigments which absorb mostly blue violet range. They broaden the spectrum of light that provides energy for photosynthesis.

Q.3: Short answer questions.

(i) Define deductive reasoning and inductive reasoning.

Ans. Deductive Reasoning: "Deductive reasoning is a reasoning from the general to the specific."

Example: If we accept that all birds have wings and that sparrows are birds, then we conclude that sparrows have wings.

Inductive Reasoning: "Inductive reasoning is a reasoning from the specific to the general".

Example: If we know that sparrows have wings and are birds, and we know that eagle, parrot, crow are, birds, then we induce that all birds have wings.

(ii) **What is hydroponic culture technique? Give its importance.**

Ans. **Hydroponic Culture Technique:** Hydroponic culture technique is used to test whether a certain nutrient is essential for plant or not. In this technique the plants are grown in aerated water to which nutrient mineral salts have been added.

Importance: Astronauts may use it for growing vegetables.

(iii) **Give functions of smooth endoplasmic reticulum.**

Ans. **Functions of Smooth Endoplasmic Reticulum:**

1. **Transportation of Materials:** Smooth reticulum plays an important role in the transport of materials from one part of the cell to the other.

2. **Detoxification of Harmful substances:**

Smooth endoplasmic reticulum due to its own enzyme system metabolizes or destroys the toxic substances like steroids, carcinogens, toxin etc.

3. **Synthesis of Lipids:** The smooth endoplasmic reticulum synthesizes different types of lipids which are used for the formation of plasma membrane and steroid hormones like testosterone and estrogens. Glycogen and glycolipids are also synthesized here.

4. **Transmission of Nerve Impulse:**

The smooth endoplasmic reticulum of the muscle cell is well developed and is involved in the transmission of nerve impulse which initiates muscle contraction.

(iv) **Differentiate between Prokaryotic and Eukaryotic.**

Ans.

Prokaryotic Organisms	Eukaryotic Organisms
1. Organisms possessing prokaryotic cells are called prokaryotes e.g., bacteria and blue green algae.	1. Organisms possessing eukaryotic cells are called eukaryotes e.g., plants, animals, fungi and protists.
2. They lack many of the membrane bounded structures e.g., mitochondria, endoplasmic reticulum, golgi bodies and chloroplasts etc.	2. They have membrane bound structures.
3. Nuclear membrane is absent, therefore, prokaryotic cell has no distinct nucleus.	3. A double nuclear membrane is present. They have a well defined nucleus.
4. Prokaryotes have a small sized 70S ribosomes. Mitosis is missing and cell divides by fission.	4. Eukaryotes have 80S ribosomes. Mitosis occurs.

(v) **Give the characters of Oomycotes.**

Ans. **Characters of Oomycotes:**

1. Oomycotes cell walls contain cellulose.
2. Water molds hyphae are septate.
3. Water molds have centrioles in their cells.
4. Water molds are pathogenic organisms e.g., Phytophthora infestans

(vi) **Write down any two characteristics of protists.**

Ans. **Characteristics of Protists:**

1. The protests are unicellular, colonial or simple multicellular organisms that possess eukaryotic cell organization.

2. Eukaryotic cells, the unifying feature of protests, are common to complec multicellular organisms belonging to the three eukaryotic kingdoms (Fungi, Plantae and Animalia) but clearly differentiate protists from the members of the prokaryotic kingdom (Moenra).

(vii) What are the basis of diversity in protista?

Ans. Protista: Organisms in the kingdom protista have evolved diversity in their 1: size and structural 2: means of locomotion 3: ways of obtaining nutrients 4: interaction with the organisms 5: habitat and 6: modes of reproduction. Diversity is exhibited by all the major protist groups.

(viii) Define circinate vernation. Give an example.

Ans. Circinate Vernation: When the frond is immature and young, it is coiled, this pattern of development is called circinate vernation.

Example: Adiantum show circinate veration.

(ix) Write four characteristics of bryophytes.

Ans. Characteristics of Bryophytes:

1. **First Land Plants:** The first plants to colonize land were the bryophytes. They are generally thought to have evolved from green algae.
2. **Adaptation and Habitat:** The bryophytes are poorly adapted to life on land and are mainly confined to damp shady places.
3. **No Conducting Tissues:** These plants are devoid of specialized conducting (xylem and phloem) and strengthening tissues.
4. **Flowerless:** The bryophytes are flowerless, non - vascular plants.

(x) What are lymph nodes? What is their function?

Ans. Lymph Nodes: Lymph nodes are masses of connective tissue that contain lymphocytes and through which lymph is filtered.

Lymph nodes are present in the neck region, axilla and groin of humans.

Function of Lymph Nodes: The main function of lymph nodes is to filter the lymph because lymph nodes contain lymphocytes which help to provide immunity against the disease.

(xi) Define Antigen and Antibody.

Ans. Antibodies: The antibodies are special types of proteins called immunoglobulin. The vertebrates produce antibodies in response to antigens. The antibodies are specific. They destroy the only antigen which has stimulated the formation of those antibodies. Antibodies are synthesized in B-lymphocytes. Then these are secreted into the lymph and blood. Antibodies circulate freely in the lymph or blood.

Antigen: The antigen or immunogen is a foreign substance (often proteins) which stimulates the synthesis of antibody formation. The antibodies immobilize the antigen. It ultimately causes the destruction of the antigen.

(xii) What is Passive Immunity?

Ans. Passive Immunity: In passive immunity, antibodies are injected in the form of antisera, to make a person immune against a disease. Passive immunity response is immediate, but not long lasting because no time is taken for the production of sufficient level of antibodies and after the level of antibodies is reduced or they are used up no more antibodie

production is there. The method of passive immunization is used to combat active infections of tetanus, infectious hepatitis, rabies, snake bite venom etc. Passive immunity is the immunity to disease provided indirectly, as in the transfer of antibodies from mother of fetus across the placenta.

3.2 Short answer questions.

(i) **What is binomial nomenclature? What are the rules of nomenclature?**

Ans. **Binomial Nomenclature:**

Binomial Nomenclature is the assignment of names to organisms using two Latin words, the first denoting the genus and the second descriptive name, the two, together constitute the name of species.

Rules of Binomial Nomenclature: Following are some rules of Binomial nomenclature.

1. The name of species are derived from Latin or Latinized Greek words.
2. Scientific names are usually printed in italics. When handwritten they are underlined.
3. The first generic name always begins with capital letter.
4. The second specific name is written in small letters.

Examples:

Common Names	Scientific Names
Man	Homo sapiens
Onion	Allium cepa
Amaltas	Cassia fistula

(ii) **Differentiate between lytic and lysogenic phage.**

Ans.

Lytic Phage	Lysogenic Phage
Lytic phage undergoes lytic cycle in which phage viral nucleic acid immediately after entering the host cell, takes the control of the host's biosynthetic machinery and induces the host cell to synthesize viral DNA and proteins. As new bacteriophages are formed, bacterial cell burst, i.e., it undergoes lysis. Newly formed phages are released to infect the bacteria and another lytic cycle begins.	Lysogenic phage undergoes lysogenic cycle in which phage viral DNA, instead of taking over the control of host's machinery, becomes incorporated into the bacterial chromosome. Phage in this state is called prophage. Each time the bacterial chromosome is replicated, the prophage also is replicated, and hence all daughter bacterial cells are infected with the prophage.

(iii) **What are trichomes? Give the structure and function of Heterocysts.**

Ans. **Trichome:**

Trichome is a chain of cells of cyanobacteria. When trichome is surrounded b[y] mucilaginous sheath, it forms **filaments** of colony of cyanobacteria.

Structure of Heterocysts: Heterocysts are large, round, light yellowish thick walled ce[lls] present at intervals in trichome of cyanobacteria.

Function of Heterocysts:

1. Trichome of cyanobacteria mostly breaks near heterocyst and forms harmogonia a[nd] thus help in fragmentation.
2. Heterocysts are helpful in the fixation of atmospheric nitrogen.

(iv) **What are the functions of flagella, pili, slime and capsule in bacterial cell?**

Ans. Functions of flagella in bacterial cell:

1. They help in motility.
2. Flagella also help the bacteria to detect and move in response to chemicals, a process known as chemotaxis.

Function of pili in bacterial cell:

1. They are involved in conjugation process.
2. Some pili function as a means of attachment of bacteria to various surfaces.

Function of slime in bacterial cell

1. Slime provides greater pathogenecity to bacteria and protects them against phagocytosis.

Function of capsule in bacterial cell:

1. Capsule may provide the cell with protein against phagocytosis by other micro organisms or by the host's white blood cells.
2. Capsule protects the cell against dehydration.

(v) **What is peristalsis and antiperistalsis?**

Ans.

Peristalsis	Anti-peristalsis
1. Peristalsis consists of the wave of contraction of the circular and longitudinal muscles preceded by the wave of relaxation thus squeezing the food down along the canal.	1. Anti peristalsis is the reverse of peristalsis in which the food may be passed from the intestine back into the stomach and even into the mouth.
2. Peristalsis are characteristic movements of the digestive tract by which food is moved along the cavity of canal.	2. Anti persistalsis occurs occasionally, and leads to vomiting.

(vi) **What is hunger pang?**

Ans. Hunger Pang: Hunger contractions are peristaltic contractions which are increased by low blood glucose levels and are sufficiently strong to create an uncomfortable sensation often called a hunger pang.

Hunger pang usually begin 12 to 24 hours after the previous meal or in less time for some people.

(vii) **What are the symptoms of Asthma?**

Ans. Symptoms of Asthma: Asthma is a serious respiratory disease associated with severe paroxysm (sudden attack or outburst of coughing) of difficult, usually followed by a period of complete relief, with recurrence (repetition) of attack at more or less frequent intervals.

(viii) **Write down properties of respiratory surfaces in animals.**

Ans. Properties of Respiratory Surface in Animals: Respiratory surfaces in animals are the sites where gaseous exchange takes place. The respiratory surfaces in most animals show following features.

1. **Large Surface:** The surface area should be extremely large as it is seen in the lungs in the land vertebrates and in the gills in case of fishes.

2. **Wet Surface:** The respiratory surface must be wet in order to carry out diffusion of gases.

3. **Thin Epithelium:** The distance across which diffusion has to take place should be little. In most animals the epithelium which separates air and blood is only two called thick. So the distance for diffusion is very short.

Ventilation: Ventilation maintains a steep diffusion gradient. There is a big difference in the concentration of the gases at two points which brings about diffusion.

Capillary Network: The respiratory site should possess extensive network of capillaries through which blood can pass at an adequate speedd. In this way complete diffusion gradient is maintained which helps in rapid diffusing of oxygen.

(ix) **Write down the disadvantages of gas exchange in water environment?**

Ans. **Disadvantages of gas exchange in water environment:**

More dense:

Breathing or ventilation of water is far more difficult than the ventilation of air. Because water is 8000 times more dense than air.

More Viscous:

In terms of viscosity the water is 50 times more viscous, which makes it more difficult for exchange of gases, as compared to air.

(SECTION – II)

Note: **Attempt any THREE questions.**

Q5. (a) **Define the following branches of Biology:**

i. **Microbiology** ii. **Histology**

iii. **Marine Biology** iv. **Biotechnology**

(b) **Describe various functions of blood.**

Q6. (a) **Describe fibrous and globular proteins.**

(b) **Write a note on economic gains due to fungi.**

Q7. (a) **Compare Gram positive and Gram negative bacteria on the basics of cell wall.**

(b) **Write down the life cycle of adiantum.**

Q8. (a) **Define virus. Write a note on the characteristics of viruses.**

(b) **Describe the role of water in Photosynthesis.**

Q9. (a) **Write a note on Mitochondria.**

(b) **Describe the role of large intestine in human digestion.**

PAPER NO . 5

OBJECTIVE-TYPE

Q.1: Multiple choice questions.

1. Anatomy	2. bone cells	3. Koshland	4. Tubulin
5. Prions	6. Log phase	7. Brown algae	8. Cellulose
9. Horsetails	10. 10	11. Ties	12. 680 nm
13. Magnesium atom	14. Peptic Ulcer	15. Smooth	16. 54 ml
17. Heparin			

SUBJECTIVE TYPE

(Section – I)

Q.2: Short answer questions.

(i) **Define protective role of water.**

Ans. Role: Water is effective lubricant that provides protection against damage resulting from friction.

For example: Tears protect the surface of eye from the rubbing of eyelid water also form a fluid cushion around organ that helps to protect them from trauma.

(ii) **What do you know about ionization of water?**

Ans. Ionization of Water: The water molecule ionize to form H^+ and OH^- ions.

$$H_2O \rightleftharpoons H^+ + OH^-$$

This reaction is reversible but on equilibrium is maintained. At 25°C the concentration of each of H^+ and OH^- ion in pure water is about 10^{-7} mole.

(iii) **Define activators. Give examples.**

Ans. Activators: An activator is a chemical substance which can react (in place of substrate) with the enzyme but is not transformed into products (s) and thus blocks the active site temporarily or permanently.

Example: Example of inhibitors are poisons, like cyanide, antibodies, antimetabolites and some drugs.

(iv) **Define co-factor. Write its function.**

Ans. Co-factor: Some enzymes consists solely of proteins. Other also have a non-protein part known as a co-factor which is essential for the proper functioning of the enzyme. The co-factor act as "bridge" between the enzyme and its substrate often it contribute directly to the chemical reactions which bring about catalysis. Sometime the co-factor provide a source of chemical energy.

(v) **What are competitive inhibitors? Why they are called reversible inhibitors?**

Ans. Competitive Inhibitors: Competitive inhibitors because of the structural similarities with the substrate they may be selected by the binding sites, but are not able to the active the catalytic sites. Thus product are not formed.

They form weak linkages with the enzymes. Their effect can be neutralized completely or partly by an increase in the concentration of the substrate competitive inhibitors are the type of reversible inhibitor.

(vi) **Why slime molds are included in kingdom protoctista?**

Ans. Slime molds have unusual morphology. Hence they are placed in kingdom Protista. Some stages of their life cycle exhibit Protistan characteristics while some other stages exhibit fungal characteristics.

1. Slime mold lack chitin in their cell walls. Hence they are not fungi.
2. Slime molds have a single yellow blob with many nuclei. This characteristic feature of plasmodium.
3. Spores produced in slime molds have cellulose in their cell walls which is not present in fungal cell walls.

(vii) **What are zygomycetes? Why they are named so?**

Ans. Zygomycetes: During their sexual reproduction, zygote formed directly by the fusion of

hyphae forms temporary, dormant thick walled resistant structure called *zygospore* hence the name *zygomycetes*.

(viii) What is blastostyle?

Ans. Blastostyle: In coelenterates reproduction takes place by asexual as well as sexual mean. Hydra reproduce asexually by the formation of buds on its surface. The bud after some time separate from the parent and develop a new individual. In Obelia for example there asexual as well as sexual reproduction. It has a kind of zooid known as blastostyle which gives rise to individual zooids called medusae by asexual method. The medusae are released in water develop reproductive organs which produce gametes that unite to form zygote from which obelia colony is again formed.

(ix) Differentiate between anamniotes and amniotes.

Ans.

Anamniotes	Amniotes
Anamniotes are the vertebrates which are without fetal memebranes. **Examples:** Cyclostomata, Chondrichthyes, Osteichthyes and Amphibia.	Amniotes are the vertebrates which are with fetal membranes. **Example:** Reptilia, Aves and Mammalia.

(x) What is honey dew?

Ans. Honey Dew: The composition of materials flowing in phloem has been studied by using aphids. The insects which are phloem feeders. These insects insert their stylets into stem are leaf and extend them to puncture a seive tube. The pressure in the ceive tube cell forces sap through aphid's digestive tract and out its posterior end as droplets called honey dew.

(xi) What is a porphyrin ring of a chlorophyll molecule?

Ans. Porphyrin ring of chlorophyll molecule: The flat, square, light-absorbing hydrophilic head of structure of chlorophyll molecule is called porphyrin ring. It is made up of 4 joined smaller pyrrole rings composed of carbon and nitrogen atoms. An atom of magnesium is present in the centre of porphyrin ring and is coordinated with the nitrogen of each pyrrole ring.

(xii) What do you know about flame cells?

Ans. Flame Cell: It is a cup-shaped cell with a bunch of cilia which work in its Lumen. It is concerned with exception. Flame cells are usually connected together by Canals which ultimately open to the exterior of the animal.

Q.3: Short answer questions.

(i) Define ecosystem with an example.

Ans. Ecosystem: A community together with its nonliving surroundings is called ecosystem.

Example: Snake, antelope, hawk, bushes, grass, rocks, stream.

(ii) What is Hydroponic culture technique? Give its use.

Ans. Hydroponic Culture Technique: It is a technique used to test whether certain nutrients is essential for plants or not. In this technique the plants are grown in aerated water to which nutrient, mineral and salts have been added. Astronauts may use it for growing vegetables.

(iii) How intermediate filaments support cell?

Ans. Intermediate filaments involve in determination of cell shape. Its also play an important role in the maintenance of cell shape and integration of cellular compartment of cells.

(iv) **What are chromoplasts?**

Ans. **Chromoplasts:** They import colours to the plants other than green. They are present in the petals of the flower and in the ripened fruit. They help in pollination and dispersal of seeds.

(v) **Why green algae are considered as ancestors of green land plants?**

Ans. Green algae are considered as ancestors of plants because:

1. Green algae have pigments chlorophyll a, chlorophyll b and carotenoids similar to plants.
2. Green algae have cell wall of cellulose similar to plants.
3. Green algae have starch as main energy reserves just like plants.
4. RNA sequencing of green algae is similar to plants.

(vi) **Explain red tides.**

Ans. Dinoflagellates are known to have occasional population explosions or blooms. These blooms frequently colour the water orange, red or brown and are known as red tides.

(vii) **What is Mantle?**

Ans. **Mantle:** The body is covered by a glandular epithelial envelope called mantle which secretes calcareous shell.

(viii) **What are gymnospermae? Give examples.**

Ans. **Gymnospermae:** The term gymnospermae literally means "Naked Seeded". The gymnospermae are heterosporous plants which produce Seeds but no fruits. The ovules in these plants are usually born on the exposed surfaces of megasporophylls. Gymnosperms have independent, dominant sporophyte but less conspicuous, dependent gametophyte.

Examples: Cycas, pinus and ginkgo etc.

(ix) **What are lenticels? Write their use.**

Ans. It is loss of water vapours through lenticels. Lenticels are the cork cambium forms, oval, spherical, or irregular cells which are loosely arranged and have many inter cellular spaces.

Lenticels are aerating pores and they involved in the exchange of gases.

(x) **Differentiate between Thrombus and Embolus.**

Ans.

Thrombus	Embolus
Thrombus is a solid mass or plug of blood constituents in a blood vessel. This mass may block (wholly or only in part) the vessels in which it forms.	The thrombous may be dislodged or carried to some other location (rather in blood vessel) in the circulatory system, in which case it is called an embolus.

(xi) **What is meant by systemic circulation?**

Ans. **Systemic Circulation:** The systemic arch distributes blood to different parts of the body, and then the blood from the body returns to the heart, in the right atrium via precaval and postcaval. This is systemic circulation.

(xii) **Define plasmolysis and deplasmolysis.**

Ans. **Plasmolysis:** Plasmolysis can be defined as the shrinkage of protoplast due to exosmosis of water. When a living cell is placed in a solution having lower water potential then that of the cell, plasmolysis takes place and the cell is called plasmolysed.

Deplasmolysis: If plasmolysed cell is placed in distilled water (which has highest water potential) the water molecules would move from distilled water through differentially permeable cell membrane into the cell, and the cell would become deplasmolysed.

Q.4 Short answer questions.

(i) **Write a short note on AIDS.**

Ans. **AIDS:** AIDS is acronym for Acquired Immune Deficiency Syndrome. It is caused by the human immunodeficiency viruses (HIV).

Symptoms: The symptoms of AIDS include are rare vascular cancer, sudden weight loss, swollen lymph nodes and general loss of immune function.

Prevention:

1. Avoid the direct contact with HIV.
2. Prevent intravenous drugs with common syringe.
3. Use sterile needles/syringes and utensils.

(ii) **What are mumps and measles?**

Ans. **Mumps and Measles:** Mumps and measles viruses belong to genus paramyxoviruses. They are large enveloped RNA viruses. Mumps is highly contagious wide spread but seldom fatal. About 60% of adults are immune to it. Measles is one of the commonest diseases of the childhood and human population. This disease develops immunity in its victim.

(iii) **What is capsid and capsomeres?**

Ans. The complete, mature and infection particle is known as viron. The virons are composed of a central core of nucleic acid, either DNA or RNA. Which is known as the genome and is surrounded by a protein coat, the capsid. Capsid give a definite shape to viron. Capsid is made up of protein subunits known as capsomeres. The number of a capsomeres is a characterics of a virus.

(iv) **What are plasmids and what is their role in genetic engineering?**

Ans. Many bacteria have plasmids in addition to main chromosomes. They are the circular, double stranded DNA molecules. They are self replicating, and are not essential for bacterial growth and metabolism. They often contain drug resistant, heavy metals, disease and insect resistant genes on them. Plasmids can be extracted and used as vector to carry foreign gene into the host bacteria during genetic engineering processes.

(v) **Describe the three kinds of cells present in gastric glands.**

Ans. **Composition of Gastric Glands:**

1. Mucus cells secrete.
2. Parietal or oxyntic cells secret hydrochloric acid.
3. Zymogen cells secrete pepsin.

Composition of Gastric Juices: Gastric juice is the secretions of three kinds of cells of gastric glands. Gastric juice contains mucus, HCL, and pepsinogen.

(vi) **Write the composition of pancreatic juice.**

Ans. The exocrine tissues of pancreas secrete a juice called pancreatic juice. The pancreatic juice has many enzymes. These enzymes digest the different components of food like carbohydrates, fats and proteins. These enzymes are:

1. **Amylase:** It is also called amylopsin. It digests starch into maltose.
2. **Lipase:** It is a fat digesting enzyme. It hydrolyses fats into fatty acids and glycerol.

3. **Trypsin:** It is secreted in inactive form called trypsinogen. Trypsin splits proteins into peptones and polypeptides.

(vii) **How haemoglobin differ from myoglobin?**

Ans. **Functions of Myoglobin:**

Myoglobin	Hemoglobin
1. Myoglobin consist of just one polypeptide chain associated with an iron containing ring structure which can bind with one molecule of oxygen.	1. Hemoglobin consists of four polypeptide chain associated with an iron containing ring structure which can bind with four molecules of oxygen.
2. The affinity of myoglobin to combine with oxygen is much higher as compared to hemoglobin	2. Hemoglobin in man increases the oxygen carrying capacity of the blood to about 75 times.

(viii) **How pH and temperature effect capacity of haemoglobin to combine with oxygen?**

Ans. **Effect of pH on Capacity of Haemoglobin to Combine with Oxygen:** The pH of blood influences the degree to which oxygen binds to haemoglobin. As the pH of the blood declines, the amount of oxygen bound to haemoglobin also declines.

Conversely an increase in blood pH results in an increased ability of haemoglobin to bind oxygen.

Effect of Temperature on Capacity of Haemoglobin to Combine with Oxygen:

Rise in temperature also causes a decrease in the oxygen carrying capacity of blood, e.g., in the increased muscular activity.

(ix) **How much Carbon dioxide is present in venous and arterial blood?**

Ans. **CO_2 percentage in Arterial Blood:** Arterial blood contains about 50ml of CO_2 per 100 ml in arterial and venous blood.

CO_2 percentage in Venous Blood: Venous blood contains about 54ml of CO_2 per 100 ml of blood.

(SECTION – II)

Note: Attempt any THREE questions.

5. (a) **Differentiate between deductive and inductive reasoning with examples.**

(b) **Define immunity. Give its types.**

6. (a) **Describe primary and secondary structure of protein.**

(b) **Give an account of Ascomycotes.**

7. (a) **Write a note on use and misuse of antibiotic.**

(b) **Describe the life cycle of an angoispermic plant.**

8. (a) **Sketch the infection cycle of HIV.**

(b) **Draw glycolysis. Give its energy balance.**

9. (a) **Describe the structure and function of plasma membrane.**

(b) **Discuss Heterotrophic Nutrition methods in plants.**

ANSWER SHEET
Name:
Roll No.
Subject:
A B C D
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

Informative Note

Knowledge is power and **HAMDARD KUTAB KHANA** is always working for the spread of knowledge, owing to its close co-operation with Education Department. It has always been an honour of **HAMDARD KUTAB KHANA** that it gives its readers awareness about the latest updates of Education Department. It also provides the helping reading material according to the new syllabus.

Unfortunately, the process of education is interrupted this year just because of the Pandemic (Covid-19). After viewing the crucial circumstances, Education Department has introduced the **Smart Syllabus** for all the classes according to the **Accelerated Learning Programme (ALP)**, this year. So that the students would be able to conduct the next annual examination 2021.

Now, **HAMDARD KUTAB KHANA** has published the Up to Date papers according to the **Smart Syllabus**, consisted of chapterwise Board Questions and annual papers for the convenience of the students.

Hopefully, these papers will be beneficial for the students of intermediate to prepare the next annual examination and get success in the board papers.

It is hoped that our this effort of providing you complete help and guidance will be admired by all of you and this effort shall also receive the same prominent place in the hearts of the learned teachers and the students.

Thanks.

Rs. 150/-

Code # UPE-1104